



THE ENERGY AND RESOURCES INSTITUTE  
Creating Innovative Solutions for a Sustainable Future



# PUTTING A PRICE ON CARBON

## Handbook for Indian Companies 2.0

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# FOREWORD



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## WILL CARBON PRICING DETERMINE THE FUTURE OF BUSINESS?

What do Anand Mahindra, the Pontifex Pope Francis and the World Bank have in common? They all think putting a price on carbon can have transformative impacts. However, it is time now that the World Bank incorporate Carbon Pricing in its lending practices and even the influential “Ease of Doing Business” index. Maybe it’s time to incorporate carbon pricing in all of the Bank’s private sector lending and to rechristen it to “Future of Doing Business”?

Climate change is posing enormous economic and policy problems, pitting different narratives of environment versus development. To incorporate climate change within development in a manner coherent with national and global constraints is a challenge for governance. Evidence suggests that this is a false dichotomy. A 2019 IMF paper<sup>i</sup> stated that India would gain external revenues of approximately 0.6 percent of GDP in 2030 from joining a price floor of US\$35 per tonne and selling ITMOs.

Carbon price has been long advocated as a means to effectively reduce GHG emissions. There is growing concerns about the widening gap between carbon budget and mitigation actions and evidence suggests that we might reach the point of no return for climate action as soon as 2035<sup>ii</sup> unless newer technologies and share of renewables are able to abate further GHG emissions.

Although Article 6 of Paris Agreement, governing the establishment of carbon markets, remained unresolved at COP25, it is almost certain carbon pricing will become more mainstream in coming years. Explicit carbon taxes, border tax adjustments and carbon markets are likely to be used as a mechanism to regulate global emissions. In order to help understand and quantify potential climate risk impacts, the Task Force on Climate Related Financial Disclosures recommends the application of ICP as a key metric in scenario analysis because it is forward-looking and can help internalize the idea of carbon risk and prepare to aggressively compete in a carbon-constrained world. In addition to this, ICP is also a unique tool to help organizations create funds that can be used to invest in low carbon transition.

Businesses will play a key role in accelerating the shift to a low-carbon transition. Many in the Indian corporate world are already aware and taking steps to address the enveloping risk. While carbon price was considered a sensitive item to be included in the Paris agreement, on the other hand business were already applying voluntary carbon prices on themselves called the Internal Carbon Price (ICP).

While the numbers are slowly increasing, the challenges remain for a fast track adoption. These include – Developing an internal carbon price that is in line with company strategies; Choosing an appropriate price level that is not only imperative for organizational GHG emissions curbs but also aligned with global goals; Choosing a type of carbon price that is able to achieve bold and ambitious GHG reduction targets. This is not a sliver bullet to counter climate change, but a crucial step towards mitigating risk and exploring opportunities.

We bring together various approaches and case studies in an updated handbook on carbon pricing. The first handbook was prepared to lay out the landscape of carbon pricing and help companies understand about external and internal carbon pricing along with guidance on how to approach an internal carbon price. The aim of the second handbook is to further mobilize the adoption of internal carbon price by companies. The steps on how to arrive at a price and use it in their organization including indicative pricing levels are discussed in the handbook. Like the former handbook, CDP has partnered with TERI for their take on the policy angle of external carbon pricing.

i. <https://www.imf.org/en/Publications/Policy-Papers/Issues/2019/05/01/Fiscal-Policies-for-Paris-Climate-Strategies-from-Principle-to-Practice-46826>

ii. <https://www.earth-syst-dynam.net/9/1085/2018/>

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# CONTENTS

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Chapter 1: An Overview to Carbon Pricing	1
Chapter 2: The Need for Internal Carbon Pricing	3
Chapter 3: Steps to Setting Internal Carbon Price	8
Chapter 4: Exploring Indicative Price Levels	17
Chapter 5: The Policy Landscape in India and Globally	26
Chapter 6: Corporate Best Practices on Carbon Pricing	33
Chapter 7: Case Studies of Indian Companies pricing carbon	38
Looking Forward	42

# AN OVERVIEW TO CARBON PRICING

**CDP's mission and work on climate risk:** CDP's mission is to focus investors, companies and cities on taking action to build a truly sustainable economy by measuring and understanding their environmental impact.

Market behavior requires systemic change in order to address the global challenges of climate change, water scarcity and deforestation. CDP's global disclosure system, created over the last two decades, has been helping to achieve this aim. It has built a comprehensive collection of self-reported environmental data. This has sparked unparalleled engagement on environmental issues between investors, companies, cities, states and regions worldwide to help them make the right choices.

## LOOKING BACK AT THE FIRST CARBON PRICING HANDBOOK

Launched in October 2017, the first handbook was aimed at building awareness of carbon pricing amongst companies. It approached the topic from the lens of policy and data, looking at the existing carbon pricing landscape at a national and global level. Some of the key issues covered are highlighted below.



## The current scenario

Investors have been urging companies to move beyond disclosure and commit to carbon action initiatives. This includes three specific actions in response to climate change: Make emissions reductions; disclose emissions reduction targets publicly; and invest in emissions reduction projects with a positive return. Setting an internal price on

carbon is one key initiative that has been widely emphasized by both investors and key global frameworks. Paragraph 136 of the decision text of the Paris Agreement<sup>1</sup> elucidates, *“providing incentives for emission reduction activities, including tools, such as domestic policies and carbon pricing”*.

## Types of carbon pricing

There are two types of carbon pricing – external and internal.

**External pricing** refers to mechanisms, such as a tax or emissions trading scheme where carbon emissions are directly priced. This usually has two types of explicit pricing.

**Emissions Trading Scheme (ETS):** Sometimes referred to as a cap and trade system, ETS caps the total level of greenhouse gas (GHG) emissions. It allows those industries with low emissions to sell their extra allowances to larger emitters.

**Carbon taxes:** This sets a price directly on carbon by defining a tax rate on GHG emissions or – more commonly – on the carbon content of fossil fuels. CO<sub>2</sub>e emissions can also be priced implicitly by government policies that encourage emissions reductions, such as energy efficiency standards and renewable energy subsidies. For example, the excise duty on petrol and diesel in India is an implicit carbon tax.

<sup>1</sup> Paris Agreement 2015, [https://unfccc.int/files/essential\\_background/convention/application/pdf/english\\_paris\\_agreement.pdf](https://unfccc.int/files/essential_background/convention/application/pdf/english_paris_agreement.pdf)

An **internal carbon price (ICP)** is a voluntarily determined price used within a company to value the cost of a unit of CO<sub>2</sub>e emission. This price tends to reflect the market prices of the regions where the company trades, although some companies may set theirs differently, based on their objectives.

green products/services – in order to facilitate a company-wide low-carbon transition. This includes companies who utilize the voluntary carbon markets to offset their emissions. Increasingly, though, the focus has been on driving down emissions within the company.

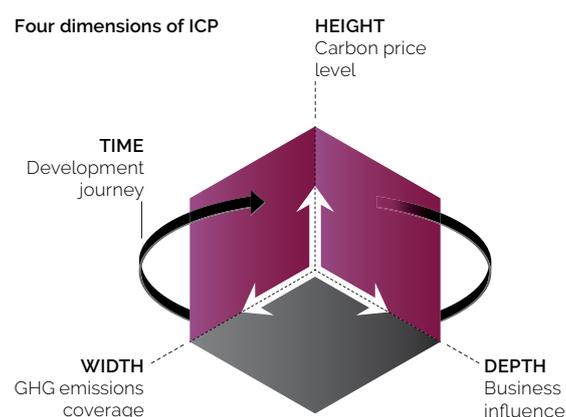
## Use of an ICP

Across industries and geographies, there are three common purposes of using an internal carbon price:

- 1) **Manage risks:** Companies internalize the existing, expected or potential price of carbon—from an ETS, carbon tax, or implicit carbon pricing policy—to assess its risk exposure to regulations that affect the cost of emitting CO<sub>2</sub>e.
- 2) **Reveal opportunities:** Companies also use an internal carbon price as a tool to reveal potential opportunities that may emerge with the transition to the low-carbon economy. As policy, legal, market, technological and reputational factors shift, these opportunities emerge. When used as a generic proxy in this way, an internal carbon price can help guide strategic decisions, such as low-carbon R&D to create the products and services of the future.
- 3) **Transition Tool:** A smaller number of organizations deliberately use an ICP to drive emissions reductions and incentivize support for low-carbon activities – such as investments in energy efficiencies, clean energy, or R&D of

## How to design an ICP approach

The first handbook also showcased a “how-to guide”<sup>2</sup> which provides step-by-step guidance for designing and implementing an ICP approach, and a special C-suite version to help board members identify the most appropriate solution for their company. The guide provided a new 4D framework approach to ICP which provides a way to establish clear objectives and optimal combination of parameters from the outset.



## Four dimensions of an ICP

DIMENSION	ICP PARAMETER	BEST PRACTICE ICP APPROACH
Height	Price level per unit of GHG emitted (e.g. US\$/t CO <sub>2</sub> ) that the company uses in business decisions	Rise to a carbon price capable of changing decision-making in line with the ICP objectives
Width	GHG emissions covered throughout the value chain by the ICP approach	Grow to cover all GHG emissions hotspots in the entire value chain that can be influenced
Depth	Influence the ICP approach has on the business decisions of a company and its value chain partners	Become increasingly influential to have a material impact on business decisions
Time	The development of the first three dimensions over time	Be evaluated regularly to bring the company's business strategy in line with a low-carbon economy

<sup>2</sup> Ecofys, The Generation Foundation and CDP, How-to guide to corporate internal carbon pricing – Four dimensions to best practice approaches, December 2017. Prepared under the Carbon Pricing Unlocked partnership between the Generation Foundation and Ecofys in collaboration with CDP. Accessible at <https://www.cdp.net/en/reports/downloads/2740>

## THE NEED FOR INTERNAL CARBON PRICING

### Top reasons to internally price carbon

1. It is a vital part of efficient emission-reduction strategies
2. It helps make informed decisions and incentivize low-cost abatement options
3. It is a useful preparatory tool for future government climate policies
4. It enables fund creation for low-carbon transitions
5. Investors are increasingly supporting a price on carbon to assess their portfolio exposure.

The most significant consequences of carbon-related risks are only emerging over time, and their magnitude is uncertain. Investor concern about climate risk is on the rise, and this interest comes on the back of increasing concern about its financial implications. For companies, internal carbon pricing has emerged as a powerful approach to assess and manage the transition to a low-carbon economy. Assigning a monetary value to the cost of carbon emissions helps companies monitor and adapt to real-time and potential future shifts in the external market.

Mark Carney, Governor of the Bank of England and Chairman of the G20's Financial Stability Board-led Task Force on Climate-Related Financial Disclosures (TCFD) defines an ICP as "an internally- developed estimated cost of carbon emissions," which "can be used as a planning tool to help identify revenue opportunities and risk, as an incentive to drive energy efficiencies to reduce costs, and to guide capital investment decisions."<sup>3</sup> The TCFD specifically lists ICP as a key metric to assess climate-related risks and opportunities in line with its strategy and risk management process. It states, "where relevant, organizations should provide their internal carbon prices as well as climate-related opportunity metrics, such as revenue from products and services designed for a low-carbon economy".

TCFD's recommended ICP disclosure outline for companies includes:<sup>4</sup>

- ▶ Assumptions made about how carbon price(s) would develop over time (within tax and/ or emissions trading frameworks);
- ▶ Geographic scope of implementation;
- ▶ Whether the carbon price applies only at the margin or as a base cost;
- ▶ Whether the price is applied to specific economic sectors or across the whole economy, and in what regions;
- ▶ Whether a common carbon price is used (at multiple points in time) or differentiated prices; and
- ▶ Assumptions about scope and modality of a CO<sub>2</sub> price via tax or trading scheme.

In other words, an ICP provides an incentive or added reason to reallocate resources toward low-carbon over high-carbon activities. This can vary from energy efficiency improvements to emissions reductions, and renewable energy procurement. Applying a carbon cost to investment decisions supports a better return on investment, thus creating a clear business case. It can also be used to determine the R&D investments necessary for new low-carbon products and services; a priority for companies seeking to cut emissions from the manufacturing process and attract customers interested in low-carbon, low-cost solutions.

<sup>3</sup> Putting a Price on Carbon: A Handbook for Indian Companies, October 2017, accessible at <https://www.cdp.net/en/reports/downloads/2738>

<sup>4</sup> The Use of Scenario Analysis in Disclosure of Climate-Related Risks and Opportunities, Technical Supplement, <https://www.fsb-tcfid.org/wp-content/uploads/2017/06/FINAL-TCFD-Technical-Supplement-062917.pdf> page 9

The urgency is equally clear. The 2018 Special Report<sup>5</sup> from the Intergovernmental Panel on Climate Change (IPCC) emphasized the need to bend the curve on global GHG emissions to avoid the worst impacts of climate change. As per the High-Level Commission on Carbon Prices, led by Nobel Laureate Joseph Stiglitz and Lord Nicholas Stern, meeting the world's agreed climate goals in the most cost-effective way while still fostering growth requires countries to set a strong carbon price, with the goal of reaching US\$ 40-80 per tonne of CO<sub>2</sub> by 2020 and US\$ 50-100 per tonne by 2030.<sup>6</sup>

So, in the future, explicit carbon taxes or similar schemes in the form of a carbon market are likely to be used as a mechanism to regulate global emissions.

Asia is already the most vulnerable continent to disaster risks. India, with a rapidly growing economy vulnerable to the ravages of climate change, needs to pay sustained attention to tackling this issue. China, for example, saw a near doubling for corporate action on carbon pricing after it announced its emission trading schemes.<sup>7</sup> The Indian market awaits a similar signal from the government. This will further spur the corporate sector to internalize carbon risk and prepare to aggressively compete in a carbon-constrained world.

## THE BUSINESS CASE FOR CARBON PRICING

Carbon price has long been discussed and implemented in many jurisdictions, organizations and institutions. Carbon management has increasingly become an area of importance for many businesses. While the type of carbon price and method of implementation varies from stakeholder to stakeholder, six factors dominate the business case for carbon pricing.

### 1. A robust carbon pricing system plays an important role in driving GHG reductions.<sup>8</sup>

Article 2.1c of the Paris Agreement emphasizes the commitment towards 'making finance flows consistent with a pathway towards low GHG emissions and climate-resilient development'.

The required low-carbon transition needs financial flows to be directed towards low-capital investments, R&D, and low-carbon technologies. Without aligning finance with climate goals; mitigation and adaptation cannot be achieved at the required scale either by countries or by organizations.

### 2. Carbon pricing will complement climate policies for sustained and successful emission reductions.

Country policies as well as organizational policies need to look at integrating their internal strategy with broader climate goals. For example, finding avenues for aligning, relocating, or creating funds for low-carbon transition. Achieving the Paris objectives will require all participating countries to implement climate policy packages, which should include multiple policies and instruments. In the same way, companies will have to utilize pricing tools if they are to achieve emission reduction targets. While the design of these packages will vary, based on national and local circumstances, a well-designed carbon-pricing system is an effective means towards reducing GHG emissions.

### 3. Carbon prices help to make informed decisions and incentivize low-cost abatement options.

As an immediate effect, carbon prices can help enable change in employee behavior and processes. This includes shifting to less carbon-intensive fuel, moving towards enhanced energy efficiency, adopting abatement technologies and investing in cleaner alternatives. In the longer term, it helps promote innovation towards low-carbon products, technologies, and business models. As the development of green technology often requires ongoing investments, some economists consider that carbon pricing has the potential to help 'kick-start' cleaner energy industries (Aghion, Veugelers, and Hemous 2009).

### 4. ICP will be a useful preparatory tool for future government climate policies.

Many corporations have already introduced ICP into their decision-making process for future

<sup>5</sup> IPCC, 2018: Global Warming of 1.5°C.

<sup>6</sup> Carbon Pricing Leadership Coalition, 2017: Report of the High-Level Commission on Carbon Prices. Accessible at <https://www.carbonpricingleadership.org/news/2017/5/25/leading-economists-a-strong-carbon-price-needed-to-drive-large-scale-climate-action>

<sup>7</sup> CDP analysis of carbon pricing data

<sup>8</sup> World Bank Group, 2019, Report of the High-Level Commission on Carbon Pricing and Competitiveness. World Bank Group, Washington, D.C., accessible at <https://openknowledge.worldbank.org/bitstream/handle/10986/32419/141917.pdf?sequence=4&isAllowed=y>

projects. From creating a clear business case to driving R&D investments, it helps make changes towards reduced emissions. Assigning a financial value to both emitted and avoided volumes of CO<sub>2</sub> emissions also helps reveal the hidden risks and opportunities in a company's operations and supply chain. This is particularly relevant for companies that have to navigate an array of carbon pricing regulations because their operations span multiple countries.

### **5. Investors are increasingly demanding comprehensive climate disclosure.**

Since the Paris Agreement, investors are increasingly seeking assurance that companies are adequately lowering their risk exposure to carbon pricing policies; and reallocating capital toward areas of their business that will see a higher return in a low-carbon economy. Transparency on the carbon footprint of firms and investments has been promoted by Mark Carney, as Governor of the Bank of England and Chairman of the G20's Financial Stability Board, CDP, and the TCFD. Financial institutions are also looking at other measures such as green bonds, whose annual issuance has risen to more than US\$ 155 billion globally.<sup>9</sup> Emerging markets like India and China are seeing increasing activity. As green bonds continue to gain public acceptance and investor confidence, they help establish standards in new markets that impact reporting and eligibility.

### **6. Carbon pricing will stay, and be instituted more widely.**

During COP25 in 2019, the World Bank announced the Partnership for Market Implementation (PMI). This Partnership will provide technical assistance to countries to design, pilot and implement carbon pricing and market instruments. This will support the direct implementation of carbon pricing in at least 10 developing countries and help a further 20 countries prepare to do so.

In fact, one of the key messages delivered at the Asia-Pacific Climate Week (APCW) held in Bangkok, Thailand in September 2019 was that "business and investors are critical actors for delivering climate action in the Asia-Pacific" and that businesses need to have a central role going forward.<sup>10</sup>

Carbon pricing is gaining traction in the Asia-Pacific as a business tool to increase competitiveness. It helps companies improve their business models, meet stakeholder demands (especially investors), and spur low-carbon innovation towards meeting regional (and global) climate ambitions".

– Ryal Wun, CPLC Singapore & United Nations Global Compact Singapore<sup>11</sup>

The Business Leadership Criteria on Carbon Pricing<sup>12</sup> is designed to inspire companies to reach the next level of climate performance and sets a high bar for commitment. By signing up, companies commit to align their actions with three core elements:

- ▶ Set an internal carbon price high enough to materially affect investment decisions that drive down GHG emissions;
- ▶ Publicly advocate the importance of carbon pricing through policy mechanisms that take into account country specific economies and policy contexts; and
- ▶ Communicate on progress over time on the two criteria above in public corporate reports.

The UN Global Compact calls on companies to set an internal price at a minimum of US\$ 100 per metric ton over time.

9 Feller, Gordon. 2019. "Europe Leads in Financing Green Energy Projects". *T&D World*, November 26, 2019. Retrieved from <https://www.tdworld.com/utility-business/article/20973431/europe-leads-in-financing-green-energy-projects>

10 Carbon Pricing Leadership Coalition, 2019. Outcomes of Asia-Pacific Climate Week. Accessible at <https://www.carbonpricingleadership.org/news/2019/9/18/pricing-pollution-will-be-critical-for-decarbonization-in-the-asia-pacific>

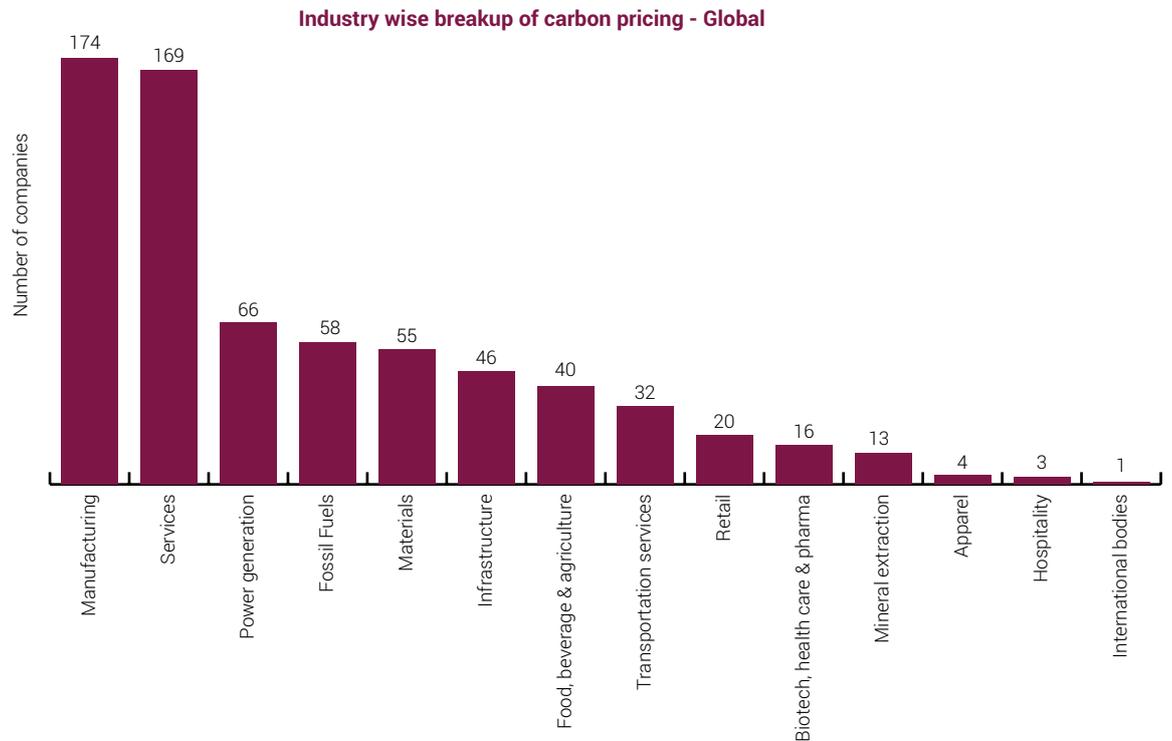
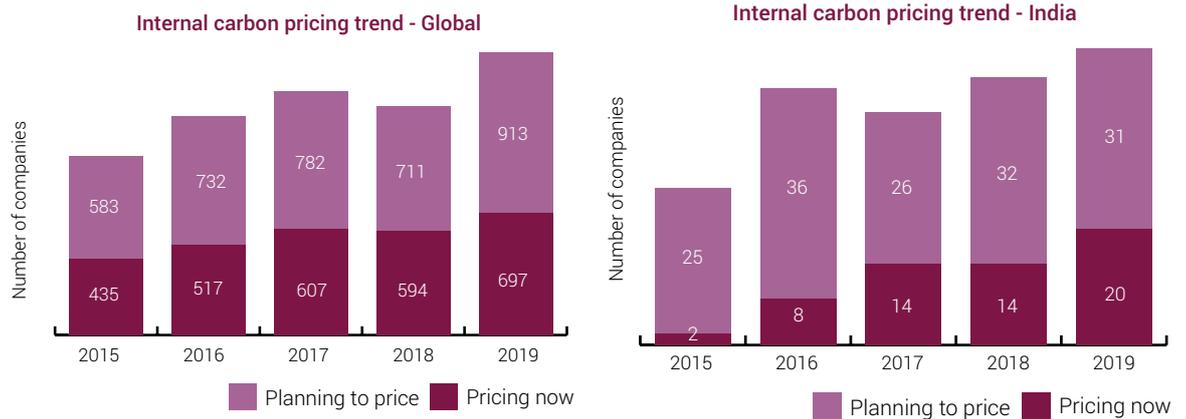
11 Carbon Pricing Leadership Coalition, 2019. Outcomes of Asia-Pacific Climate Week. Available at <https://www.carbonpricingleadership.org/news/2019/9/18/pricing-pollution-will-be-critical-for-decarbonization-in-the-asia-pacific>

12 Launched by UNGC in UNSG Climate Summit September 2014

## THE CURRENT STATISTICS

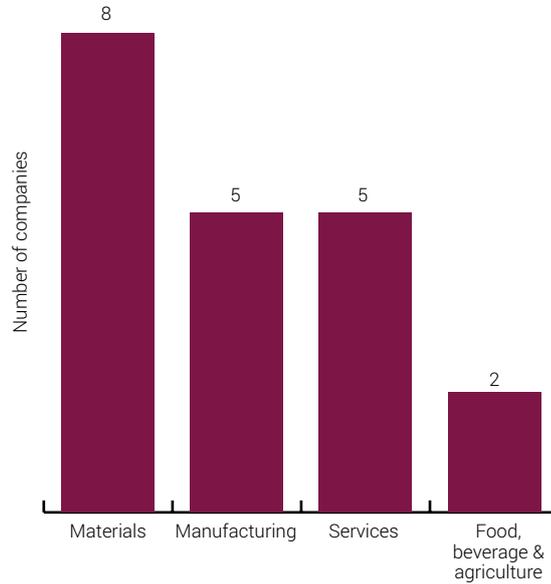
There is a gradual increase in the adoption of ICP.<sup>13</sup> From 2018-19, there's been an increase of 17% among companies pricing carbon globally; and 43% in India. Globally, the Manufacturing

industry is leading the numbers in adopting carbon pricing. In India, it is the Materials industry followed by the Manufacturing. This is well reflective of the fact that these high emitting sectors have to drastically reduce their emissions to meet the Paris agreement.



<sup>13</sup> Disclaimer: The CDP questionnaire, including the internal carbon pricing question, experienced modifications between 2017 and 2018 in efforts to minimize reporting burden for companies and improve data precision. The decrease in carbon pricing figures can be in part explained by these changes. Specifically, some companies who previously responded to the carbon pricing question elected to respond to CDP's new minimum questionnaire which does not include question C11. Moreover, subsidiaries who previously disclosed uniquely now submit a collective questionnaire under their parent company. Companies also had the opportunity to respond to the minimum tier questionnaire if they were responding to the questionnaire for the first time, or had not responded within the last five years."

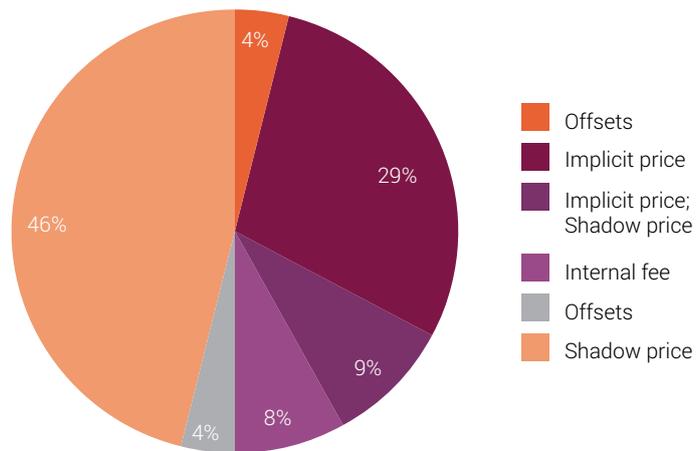
**Industry wise breakup of carbon pricing - India**



Among the types of carbon pricing, shadow price usage continues to dominate globally. GHG emissions are global externalities. Scenarios for economic analysis of a project can be done both with and without the shadow price of carbon. However, analysis with the shadow price of carbon reflects

the global impacts of a project considering climate change, GHG emissions and carbon constraint scenarios. The graph below illustrates the type of carbon pricing being used by Indian companies.

**Type of ICP used by Indian companies**



## STEPS TO SETTING INTERNAL CARBON PRICE

Setting an ICP is a strong commitment towards change and action. While companies are primarily interested in determining their price level, it is first important to set the context for ICP in any business. Comprehensive overview, decision making processes, implementation plans and monitoring parameters are required. Clarity on the goals of an ICP enables companies to take better decisions on the type and price level that will suit their needs.

While this may appear to be a complex process, breaking it down into eight steps helps navigate it more clearly.

### STEP 1: MAKE A COMMITMENT

High-level commitment within the organization gives perspective and strategic insight. Such commitments include, but are not limited to the following:

- ▶ Achieving net zero emissions, Science-based Targets (SBT), or goals under the Paris Agreement;
- ▶ Accounting of 100% Scope 3 emissions;
- ▶ Adopting Circular economy; or
- ▶ Achieving integrated environmental and social development.

Starting with a commitment enables analysis of where and how you can apply a carbon price.

#### Alternative to Step 1:

In the absence of an existing high-level commitment, ICP itself can be adopted as a commitment and you can work your way towards implementing a pathway for low-carbon transition.

### STEP 2: MAP YOUR OBJECTIVES

There can be multiple climate and environmental objectives within a company. Being able to identify and align them with the objective of having an ICP brings clarity and buy-in from all divisions. The following table can serve as guide to align the objectives/outcomes of an ICP with the objectives of your organization.

#### Mapping of organisational objectives with ICP objectives and outcomes

Potential objectives/outcomes of ICP	Climate objectives of the company	Questions to ask in the absence of any climate objective
<ul style="list-style-type: none"> <li>• Assess risk exposure</li> <li>• Carry out scenario analysis</li> <li>• Inform strategic response, and future-proof assets &amp; investments against regulatory risks (ETS, carbon tax, or implicit carbon pricing policy)</li> <li>• Demonstrate management of risk to shareholders</li> </ul>	<ul style="list-style-type: none"> <li>• Identify climate risks and the associated financial impact on company, products, and services</li> <li>• Carry out scenario analysis of a low-carbon world and its impact on your business, finances, and investments</li> <li>• Make investments, acquisitions/divestments/mergers that are future-proofed for climate regulations</li> <li>• Demonstrate to your parent company and investors that carbon risk accounting is being understood and implemented</li> </ul>	<ul style="list-style-type: none"> <li>• What is our environmental/sustainability policy?</li> <li>• How do we align with the Paris Agreement?</li> <li>• Do we have any climate targets?</li> <li>• Are our targets sufficient?</li> </ul>

Potential objectives/outcomes of ICP	Climate objectives of the company	Questions to ask in the absence of any climate objective
<ul style="list-style-type: none"> <li>Reveal cost-cutting and resilient investment opportunities throughout the value chain in the transition to a low-carbon economy</li> <li>Change employee and supplier behavior</li> <li>Discover new market and revenue opportunities</li> <li>Influence R&amp;D investment decisions</li> </ul>	<ul style="list-style-type: none"> <li>Make investment decisions between low-carbon high-cost project or high-carbon low-cost ones</li> <li>Assess and decide on suppliers based on their management of climate change issues</li> <li>Incentivize employees/units based on management of carbon footprints</li> <li>Understand existing policies and market-based mechanisms and prepare for future regulations and markets</li> <li>Discover trading opportunities and be ready for a new market-based mechanism</li> <li>Start internal trading mechanisms within the organization's different departments</li> </ul>	<ul style="list-style-type: none"> <li>Have we analyzed if our investments are future proofed against the changing climate and its impact?</li> <li>Are we investing in enough technology to build an agile business?</li> <li>Are we investing in R&amp;D to breakthrough and become a pioneer in our sector despite climate risks?</li> <li>What percentage of our investment is in green technology?</li> <li>Are we building our capacity to navigate future climate regulations?</li> </ul>
<ul style="list-style-type: none"> <li>Align investment strategy with the 2-degree scenario and align business goals with the Paris Agreement</li> <li>Accelerate reduction of GHG emissions and drive investment in energy efficiency initiatives, procurement of renewable energy, and R&amp;D of low-carbon products/services</li> <li>Generate revenue to re-invest in low-carbon activities</li> </ul>	<ul style="list-style-type: none"> <li>Align with the Paris agreement.</li> <li>Reduce GHG emissions in line with 2-degree or below 2-degree scenario</li> <li>Achieve net zero emissions</li> <li>Achieve SBTs</li> <li>Implement RE100, EP100 through efficient investments in projects that accelerate GHG reductions or projects that divert into low-carbon products and services</li> <li>Create a specialized fund for management of climate change - including for investment in low-carbon transition projects, R&amp;D, capacity building, accounting and monitoring</li> </ul>	<ul style="list-style-type: none"> <li>What is our roadmap to align with the Paris agreement?</li> <li>What climate initiatives already exist in our organization?</li> <li>Are our GHG reduction targets ambitious enough?</li> <li>Do we have a separate budget for GHG reduction projects?</li> </ul>

### STEP 3: SET THE SCOPE OF THE INTERNAL CARBON PRICE

Once the objectives are mapped, there is clarity on how to apply a carbon price to achieve them. Deciding the scope of the carbon price is the logical next step. A carbon price should ultimately cover all activities and establishments/facilities within your organization that you want to manage. To start with, however, it might be better to focus on those business operations and facilities that have the most significant GHG impact and / or those parts of the business who are keen to pilot its roll-out. Each company has both - a unique GHG emissions profile and a unique decision-making process. It is this combination that determines the degree of influence that individual business units have over GHG

emissions throughout the value chain. The coverage would also be contingent upon the difficulty or ease of measuring emissions.

Examples of how various GHG emissions relate to types of business decisions are provided in the table below.

GHG emissions	Examples of relevant decisions
Scope 1	Investment and production decisions
Scope 2	Energy purchasing decisions
Scope 3 upstream	Materials sourcing and procurement decisions
Scope 3 downstream	R&D decisions for innovative products for the current/future market

Internal questions to discuss within the company at this stage:

- What is our carbon footprint?

Companies will need to start with calculating their carbon footprint.

If carbon footprinting has already been done, then identify which source/activity has the highest GHG emissions. A good start will be to cater ICP to those areas, penalize those units, and/or start internal cap and trade.

- Do we have any emission reduction tools already in place?

If yes, then use ICP as an emission reduction tool to account for timelines and costs for achieving GHG reduction targets. If not, then utilize ICP to drive change in behavior, operations, and/or investment for emission reduction goals.

- What activities (current and future) will be covered?

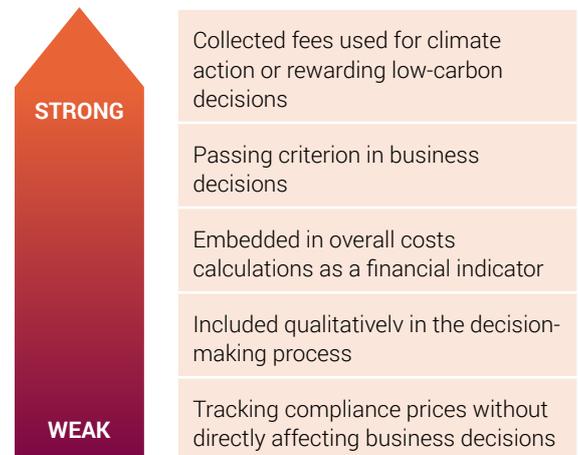
The first focus should be on the highest emission activities.

## STEP 4: ESTABLISH THE DEGREE OF INFLUENCE IN BUSINESS APPLICATION

This is probably the most important aspect of an effective internal carbon price – the more influence it has on decisions, the more likely it is to drive change, even if the price starts out at a relatively lower level.

An ICP mechanism can be integrated into a company's business decision-making process in various ways. Application approaches differ based on multiple factors. This includes a company's internal corporate governance structure, emissions profile, position in the value chain, and intended objective(s). Assessing a company's pricing approach involves understanding how the tool is applied to business decisions, and the level of influence it has on the decision-making process (i.e. to what degree does a company enforce the use of the price). Commonly disclosed operational applications include decision on capital expenditure, operations, procurement, products and R&D, and remuneration.

The following figure demonstrate some of the different applications of an ICP mechanism and the associated level of influence on day-to-day business decisions.



Every company will have a different objective for an ICP. For instance, the collected carbon fee revenue can be used to achieve emission reduction targets and consequently drive innovation. Such criteria can be listed out and agreed upon before taking a decision on employing an ICP.

Internal questions to discuss within the company at this stage:

- Which areas can the ICP be applied in? Where would it be most appropriate? It is very important for a company's ICP objectives to be clearly defined and discussed across all departments that are material to achieve its coverage.

- Who needs to be involved? Which level of management? Ideally, discussions should start from the top management or board-level. At the same time, it is vital to involve managers where the actual implementation of these decisions will be done. The finance department is also a key stakeholder in these discussions.

## STEP 5: DEFINE THE TYPE OF ICP

Once the decision is made on where and to what level an ICP will affect an organization, the next step is to define the type of ICP that should be used.

The following tables detail the different types of ICPs along with their objectives, advantages and challenges.

Type of internal carbon pricing	Shadow price	Carbon fee	Implicit price	Internal trading
<b>Description</b>	A shadow price is a hypothetical cost of carbon emissions.	A carbon fee is a per-unit fee based on the amount of GHG the company emits (e.g. INR 700 per tCO <sub>2</sub> e).	An implicit price calculation helps quantify the capital investments required to meet climate-related targets.	Internal trading allows business units within a company to trade their allocated carbon credits based on respective emissions
<b>Objectives/ Usage</b>	<p>The most common form of ICP, a shadow price helps organizations better understand impacts from climate-related risks such as technological shifts or future regulations. It can help a company with both risk management as well as internal strategic planning.</p> <p>It allows companies to model or test how a range of carbon prices affect their divisions, capital investments and other planned projects. It is similar to forecasting with a range of energy prices.</p>	<p>Putting a fee on carbon helps create an actual pool of funds, generating a revenue stream to help pave the way for greener projects and further R&amp;D. This prepares a company for a carbon-resilient world. This tool has the ability to encourage a business to transform into an environmental leader.</p> <p>It allows for the creation of internal funds to invest into energy efficiency or renewable energy projects in order to cut energy costs.</p> <p>It also builds awareness of the importance of emission reductions within different business units.</p>	An implicit price helps companies understand their initial carbon footprint and is also used as a benchmark to implement a more strategic internal price.	Internal trading helps create awareness. It allows companies to prepare for stringent forms such as shadow prices or internal fees.
<b>Challenges</b>	Unless there is a clear signal from policymakers that carbon policy is being seriously explored and / or there is a clear signal from senior management that this shadow price matters (such as making it a passing criterion for projects), it is unlikely to change investment decisions in a company. However, it can be used as a mechanism for learning and if used correctly, could help support the company eventually committing to embed it seriously.	It has a higher requirement to collect data and revenue and needs a robust MRV system in place for GHG calculations. Additionally, it can be perceived as a penal measure internally.	This is less incentivizing. It can be considered somewhat backward-looking as it involves past decisions instead of future ones.	It might be difficult to convince the required business units to take part in the process.
<b>Method</b>	<p>An additional criterion is introduced in investment analysis during the calculation of the internal rate of return (IRR). The additional criterion is the carbon value which is incorporated into each investment decision and applied to resulting GHG emissions.</p> <p>This carbon price is assumed the same way assumptions are made about exchange rates or commodity prices.</p>	<p>It is implemented by voluntarily adding a cost to GHG emissions in relation to operational costs.</p> <p>It increases the operating expenses (OPEX).</p> <p>There are short-term emissions reductions. Transfers of actual funds within the company are done through two mechanisms. First, by offsetting GHG emissions by purchasing offset credits externally. Second, by providing internal financing for emission reduction projects, low-carbon products &amp; services and R&amp;D.</p> <p>The carbon fee also provides monetary incentives for pro-environment initiatives/activities.</p>	Some companies with emissions reduction or renewable energy targets calculate their 'implicit carbon price' by dividing the cost of abatement/ procurement by the tonnes of CO <sub>2</sub> e abated	Trading is driven by the allocation of a fixed number of carbon dioxide emission 'allowances' for individual business units, with each allowance equivalent to 1 metric tCO <sub>2</sub> . If business units exceed their cap, they must purchase additional allowances to offset their excess emissions. Where business units under-emit, they may sell allowances. Business units may also choose to invest in carbon offsets outside their own units in order to sell on the internal trading scheme. <sup>14</sup>

14 Convention on Biological Diversity – Markets for Carbon Offsets. Accessible at <https://www.cbd.int/financial/offsets/g-offsetclimatecarbon.pdf> page 81

Type of internal carbon pricing	Shadow price	Carbon fee	Implicit price	Internal trading
<b>Application</b>	<p>Companies specifically choose to use a shadow price for investment projects, R&amp;D projects, and for strategic transactions (e.g. purchasing a company, developing a new business activity).</p> <p>Prices may vary. Some companies may use a single price, some may use different prices for different business activities, and some may use different prices for different timeframes.</p> <p>It is generally applied during investment decision-making exercises.</p>	<p>This option can be chosen by companies who are able to calculate as well as monitor their direct (scope 1), indirect (scope 2) and other indirect (Scope 3) GHG emissions.</p> <p>Different costs of carbon can be allocated to different entities.</p> <p>Budget of business units are determined based on their emissions performance leading to penalizing or creating cuts from budgets towards central fund for emission reduction activities.</p> <p>For successful implementation, all divisions/ internal teams have to be trained and made aware of the importance.</p>	<p>This is applied to arrive at a shadow price or an internal fee.</p>	<p>Just like an external emissions trading system, internal allowances can be set up in an internal trading system which will also involve a cap on the total GHG emissions. Any business unit emitting more than the cap can buy allowances from other less-emitting units. The supply and demand of the allowance can set the price. The trading element can also be an incentive to save money by cutting emissions in the most cost-effective way.</p>
<b>Outcomes</b>	<p>A shadow price helps to prepare for policies and future regulations regarding climate change that may affect the company's operations or value chain. It also allows them to assess the resilience of investments to such regulations.</p> <p>It helps evaluate the sensitivity of investments by modelling the cost of carbon emissions and linking it to risks, costs, and market opportunities.</p> <p>It responds to investor and customer demands calling for the company to show leadership in incorporating climate risks into its investment decisions.</p> <p>It allows companies to plan emission reduction projects. It also helps plan and determine the internal carbon fee.</p> <p>Finally, it raises employee awareness of pricing signals for GHG emissions, particularly for project managers and strategic divisions.</p>	<p>A carbon fee is an immediate signal on a price for GHG emissions, resulting in a case for internal GHG reductions</p> <p>It enhances accountability with the entities/divisions responsible for the most emissions getting a cost breakdown. It showcases the emission reduction initiatives carried out or suggested by its employees.</p> <p>It also helps create a central fund for emission reduction or climate initiatives.</p>	<p>An implicit price builds awareness and helps start the ICP process.</p>	<p>This decentralized mechanism encourages business units to find the most advantageous cuts in emissions. It helps offset all or part of its GHG emissions</p>

Type of internal carbon pricing	Shadow price	Carbon fee	Implicit price	Internal trading
<p><b>Example</b></p>	<p>“IVL currently uses an internal shadow cost of carbon, primarily at this stage for scenario analysis of potential financial risks to the business from the expanding number of cap-and-trade and carbon tax systems globally. IVL currently uses a shadow cost of carbon at US\$ 15/ton of CO<sub>2</sub>e. As such we are using a global shadow price to evaluate site level risks.”</p> <p><b>Indorama Ventures Limited, Thailand</b></p>	<p>“Effective July 2012, Microsoft began charging an incremental fee based on the carbon emissions associated with our operations. The fee is charged to individual business groups based on the emissions that they incur through their use of offices, software development labs, and data centers, as well as business air travel. The funds that we collect through the fee go into a central fund that is subsequently invested in internal efficiency initiatives, green power, and carbon offset projects (to offset our unavoidable emissions) to ultimately enable Microsoft to reduce carbon emissions and be net carbon neutral...”</p> <p>Using the funds collected by the carbon fee, Microsoft has reduced emissions by 9.5 million metric tons of carbon dioxide equivalent (CO<sub>2</sub>e), purchased more than 14 billion kilowatt-hours (kWh) of green power, and achieved more than US\$ 10 million per year in energy cost savings.<sup>15</sup></p> <p><b>Microsoft Corporation, USA</b></p>	<p>“DGB Financial Group applies the internal carbon price system when make operational decisions. Our company uses the cost to derive marginal mitigation costs based on the measures we have implemented to reduce GHG emissions and the costs we have spent on environmental initiatives. It is used as a risk assessment tool for corporate strategy formulation and investment evaluation. We have considered Scope 1, 2 and 3 comprehensively to set reduction goals. By using the internal carbon price, we can place an economic value on GHG emissions and it is helpful to evaluate the opportunity and risk regarding to climate change issues in monetary. As costs and reductions are spent to manage GHG emissions each year, costs change, which in turn can determine the efficiency of the reduction. Internal carbon prices are indicators that can help make decisions about reductions.”<sup>16</sup></p> <p><b>DGB Financial Group, Republic of Korea</b></p>	<p>In 1997, BP chose the instrument of emissions trading. That decision immediately created the need to install infrastructure for trading, especially a system for collecting their emissions data. In late 1997 and early 1998, BP executives polled the business unit leaders on the emission reductions that would be achievable without incurring net present costs. A central emissions trading task force was established that would report to the Climate Steering Group, the executive-level body responsible for climate policy within BP. The task force would be responsible for grand strategy—setting the rules of the scheme, allocating permits, and ensuring compliance. Members of the task force were drawn from each of BP’s four business segments. (Exploration and Production; Refining and Marketing; Gas, Power, and Renewables; and Chemicals.) The actual trading platform was developed by oil traders, who used the BP intranet as the medium through which buyers and sellers would place bids and the market would clear. Each BU nominated one person to be responsible for trading.<sup>17</sup></p> <p><b>BP, England</b></p>

<sup>15</sup> UNFCCC. Microsoft Global Carbon Fee [News]. Retrieved from <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly/microsoft-global-carbon-fee>  
<sup>16</sup> DGB Financial Group’s CDP 2019 response  
<sup>17</sup> BP’s emissions trading system <http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.513.5248&rep=rep1&type=pdf>

## STEP 6: DECIDE PRICE LEVEL AND VARIANCE

Many companies jump too quickly to this stage of the planning. While the price level is important, ensuring management support; a high degree of influence and agreeing the objectives you are trying to achieve; are typically more important. At this stage, the finance department has a key role to play. The price signal cannot be so low that it has no impact. On the other hand, having a very high price signal can be perceived as unrealistic and over-ambitious, also creating an economic burden on the organization.

Pilot simulations can help. The number of projects to be included should be evaluated in terms of their profitability and risk-assessment. When approving the final decision, all the pilot studies can be taken into consideration.

An internal price can be derived from various other existing instruments. Any existing national price can be inserted and adapted in an organization's carbon pricing mechanism. Four key ways are:

- ▼ **Incorporating carbon prices from existing policies:** For operations in countries with existing or imminent GHG regulation, projects costing some benchmark threshold of million currency or million tonnes CO<sub>2</sub>e must undergo a sensitivity analysis that includes carbon costs. For example, **Tata Steel's** ICP is driven by mandatory emission reduction targets which have financial implications with regards to EU-ETS and emission allocations. They use both implicit price and shadow price. Carbon price assumptions are built into their financial processes, with annual forecasts feeding into their financial planning and latest views of these forecasts are taken into account through the year. In addition, carbon prices are included in their bespoke in-house model which is used to both technically and economically evaluate changes in the operation of their iron making processes.
- ▼ **Using self-imposed carbon fees:** Initially considered an aggressive approach, this is now seen as a more proactive one. This leadership approach is to impose a self-selected price to create a money pool for low-carbon investment

and transition. **Microsoft's** example in this report is a classic case study on this.

- ▼ **Setting an ICP to reach emission reduction targets:** By calculating the cost of achieving emission reduction targets within a set time period, the parameter is thereby used in all future investment decisions.
- ▼ **Using an ICP to encompass the broader valuation of natural capital:** ICP can be used to find the 'true cost' of natural capital to understand the actual holistic implication for the company; and use that price for further decision-making and changes. For example, **Ambuja Cement's** True Value project initiated in 2013 considers the internal price of carbon. The company is in the process of aligning with the Lafarge Holcim's approach on internal carbon pricing, thus normalizing the Group's approach to Indian conditions and calculating the internal price of carbon for all their manufacturing locations.

As discussed in the previous chapter, there are various types of prices one can implement, including ample opportunity to create a hybrid of prices. It is not an easy task to find the right price. Inspiration can be drawn from ICP policies from other companies and best practices from similar sectors.

Commonly used approaches are outlined below:

For scenario analysis/ assessment of risk and opportunities	For a transition tool that drives decarbonization
Based on price projections from existing or emerging policies	Based on internal discussion (to determine price level needed to influence business decisions, or accelerate decarbonization)
Based on benchmark against peers within a sector	Based on technical analysis of investment needed to achieve a specific climate-related objective (MAC curve)

Choosing the correct price level(s) is an important factor to assess the materiality of carbon risks. It is usually dependent on the business' rationale and vision. For instance, prices reflecting long-term abatement or societal costs would be more in line with stakeholder value creation. Alternatively, prices linked to expenses and revenue would be most appropriate for risk management.

The right price can enable decision makers to provide the required incentives to cut emissions efficiently, invest in low-carbon and green technologies, and conduct further R&D.

For an internal carbon fee, the price may be set at a level at which climate-related investments are envisaged. In the case of shadow price, various factors may be considered such as existing market, current rules, and anticipated future regulation.

Using scenario analysis helps apply a range of prices over various time horizons to test the resilience of the project, as opposed to setting one price.

*Internal questions to discuss within the company at this stage:*

- ▶ *What price level would best suit my business and the projects involved? Clarity will be required on whether you would like to follow best practices by your peers, align with an external policy (pricing scenarios), or an internal pricing decision. This should also align with the objectives of the company's ICP.*
- ▶ *Is there any government regulation anticipated? Does it need to be consistent with that future regulation? ICP is often used as a preparatory tool, to prepare a company for future anticipated regulations and future-proof its assets & investments. Is there scope and opportunity to experiment with this tool for this purpose?*

## STEP 7: MONITORING AND REPORTING

Monitoring and reporting the impact of an ICP mechanism is as important as creating it.

For companies using the tool to assess and manage carbon-related risks, it is essential to measure the implications of an ICP on the business. Did it reveal material risk within your business? Has it influenced business strategy or affected investment decisions? If the ICP has not impacted your business in any way, it is equally important to understand why that happened. Are there specific challenges associated with your current mechanism? Are carbon-related risks immaterial or already managed?

For companies deliberately implementing an internal carbon price as a tool to achieve a climate-related

goal, there are different questions. Has there been a tangible impact? Has the tool shifted investments toward energy efficiency measures, low-carbon initiatives, energy purchases, or product offerings?

Reflecting on the impact, or lack thereof, it is also important to report any plans to refine or evolve your approach to internal carbon pricing in the future.

*Internal questions to discuss within the company at this stage:*

- ▶ *What risks and opportunities can the company foresee?*
- ▶ *How can it add to your strategy?*

The carbon price must be incorporated into daily activities. It will need to be communicated formally, and will also involve training and awareness building for all relevant teams. Periodic assessments will be needed to verify the effectiveness and accuracy of the price adopted, in terms of the achievement of the stated goals. The short-term and long-term assessment of the ICP will vary considerably as returns are seen in a longer timeframe in the majority of projects. Profitability comparisons with and without an ICP could be made.

Remember, an ICP is a tool, and not a goal.

## STEP 8: COMMUNICATE YOUR PROGRESS

Sharing and communicating your progress is an imperative last step. This is consistent with the UN Global Compact's Communication on Progress. This allows companies to report on practical policies and activities implemented – or planned to be undertaken – and measurement of outcomes to realize the leadership criteria of carbon pricing.

Companies are invited to report on progress through an annual Caring for Climate – COP or by responding to CDP's annual request to corporations to disclose climate change information.

Communication of progress is also consistent with TCFD. This recommends companies using internal carbon pricing in stress-testing or scenario analysis disclose assumptions made about how price(s) would develop over time; the geographic and economic scope of application; whether the price

is applied across the entire company or to specific business units or decisions, and whether a uniform or differentiated price is used.

Over the years, propagating the ICP concept, particularly for companies new to ICP, has been one of the biggest challenges. However, the Paris Agreement and the TCFD recommendations have helped bring about a change in the carbon pricing culture. Businesses are now interested in learning from the experiences of other companies, both

from within their sector and across the value chain. This includes lessons in integrating carbon pricing into business models, as well as in communicating the benefits of carbon pricing to stakeholders and investors concerned about competitiveness.<sup>18</sup>

Creating investor and societal trust and confidence, future proofing assets, and building climate resilience are the key for companies when refining their approach and methodology towards a carbon price.



<sup>18</sup> International Finance Corporation and Carbon Pricing Leadership Coalition, 2018: Construction Industry Value Chain report (Page 31). Accessible at <https://static1.squarespace.com/static/54ff9c5ce4b0a53decccfb4c/t/5bcf8519a4222fb20457eaf9/1540326691209/Construction+Industry+Value+Chain.pdf>

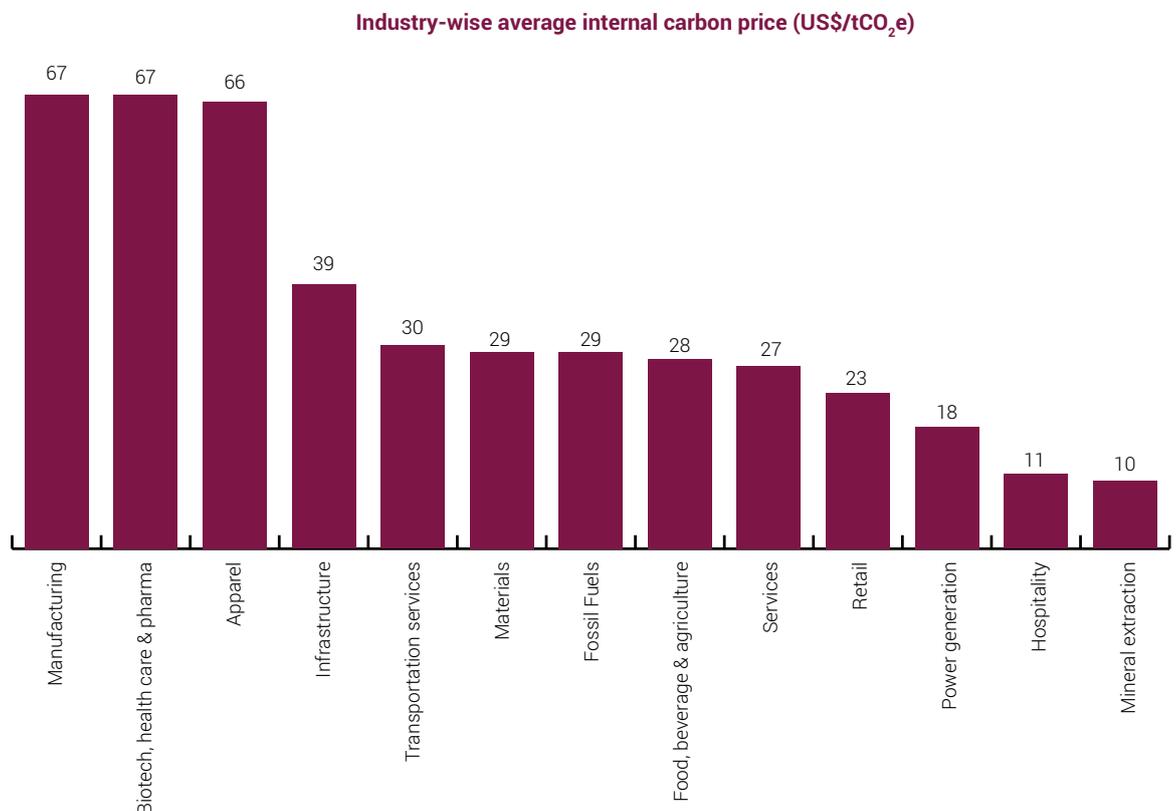
## EXPLORING INDICATIVE PRICE LEVELS

What price level will allow companies to follow a trajectory to achieve the goals of the Paris Agreement, as well as include bold targets such as net zero? A price that's practical as well as effective in reducing emissions and creating change in the organization – that is the main challenge that companies face. The uptake of an internal carbon price, and the price level itself may be voluntary, but introducing it must serve its purpose. Following the modelling and estimations of global carbon pricing can be a helpful beginning.

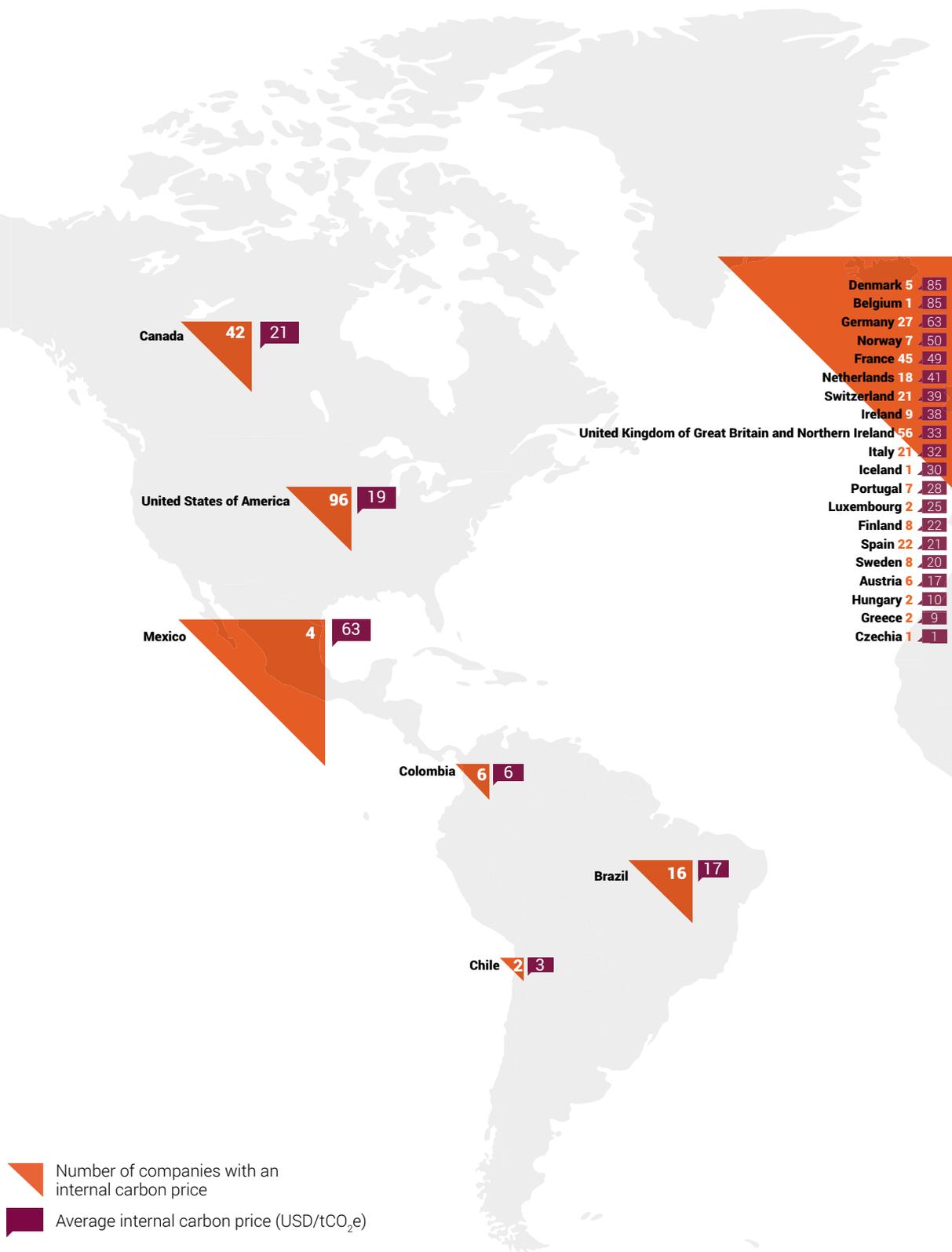
### CDP 2019 DATA

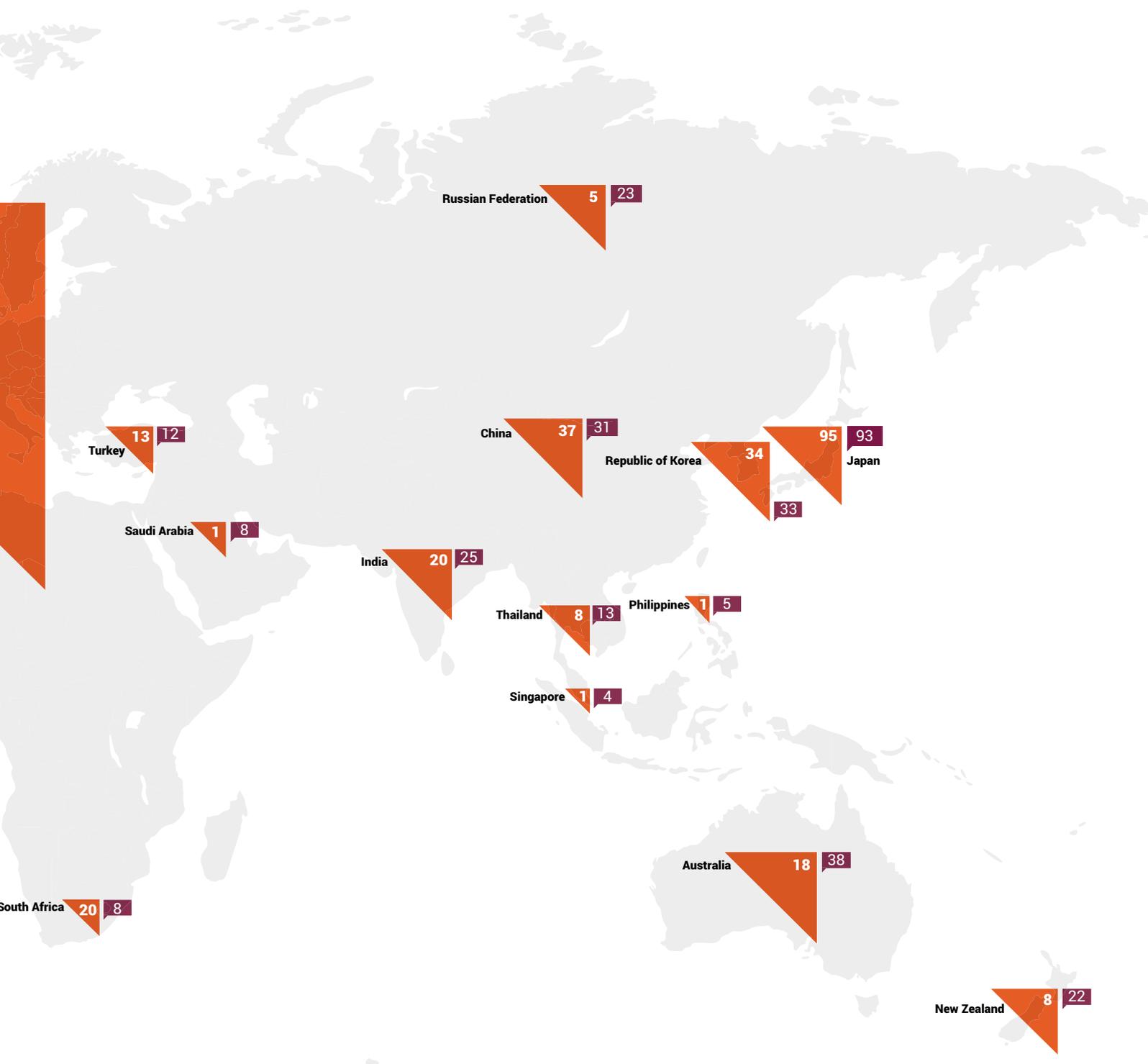
In 2019, 697 companies reported to CDP that they are putting a price on carbon. Data from these companies was analyzed to arrive at average industry wise internal carbon prices at US\$ per ton of CO<sub>2</sub>e. The graph below shows the same.

In addition to the industry-wise average, country-wise internal carbon price data was also analyzed to arrive at average prices across 39 countries. The global map in next page shows average prices along with the number of companies pricing carbon in each country.



## Number of companies and average internal carbon prices globally





The table below illustrates the internal carbon price of Indian companies reporting to CDP in 2019.

Indian companies	Price/tonne of CO <sub>2</sub> (INR)	Price/tonne of CO <sub>2</sub> (US\$)
ACC	3313	47.33
Ambuja Cements	2103.6	30.74
Creative Group of Industries	private	private
Dalmia Bharat Ltd	private	private
Godrej Consumer Products	700	10
Godrej Industries	689.71	10
Hindustan Zinc*	1118.46	16.33
Infosys Limited*	976.125	14.25
Mahindra & Mahindra	664	10
Mahindra Sanyo Special Steel Pvt. Ltd*	752.02	10.98
Mindtree Ltd	private	private
Shree Cement	private	private
Tata Chemicals*	1370	20
Tata Consultancy Services*	1131	16.51
Tata Global Beverages*	315	4.60
Tata Motors	910	14
Tata Steel	975-2210	15-34
Tech Mahindra*	685	10
Ultratech Cement*	680	9.93
Wipro	7786	120

\*\* Since these companies did not provide a conversion rate, the average conversion rate for the past five years was used (<https://www.ofo.com/en-au/forex-news/historical-exchange-rates/yearly-average-rates/>) i.e. \$1 - ₹68.5

## MARKET CORRIDORS REPORTS

In 2017, CDP and the We Mean Business (WMB) coalition launched the Carbon Pricing Corridors<sup>19</sup> initiative. The objective is to enable large market players to define the carbon prices needed for specific industries to meet the Paris Agreement goals. It is an ongoing inquiry process delivered through an expert Panel. This consists of a select group of leaders, primarily from the corporate and investment communities, along with some international experts.

The Corridors deliver carbon price signals for 2020, 2025 and 2030. This allows organizations to consider the potential financial, strategic and

business impacts resulting from the Paris Agreement in their decisions. It represents an internal pricing scenario that can be used by the private sector when stress testing against limiting to 2°C warming. The Corridors report also explains the external factors that affect that specific corridor and its prices, giving a comprehensive overview. To date, two corridors have been developed; the power sector and the chemical sector.

### Power sector carbon price signals<sup>20</sup>

The electricity generation sector is responsible for around 25% of annual global GHG emissions, and has been dominated by fossil fuel combustion processes for decades. As a result, low-carbon scenarios for

<sup>19</sup> Carbon Pricing Corridors accessible at <https://www.cdp.net/en/climate/carbon-pricing/corridors>

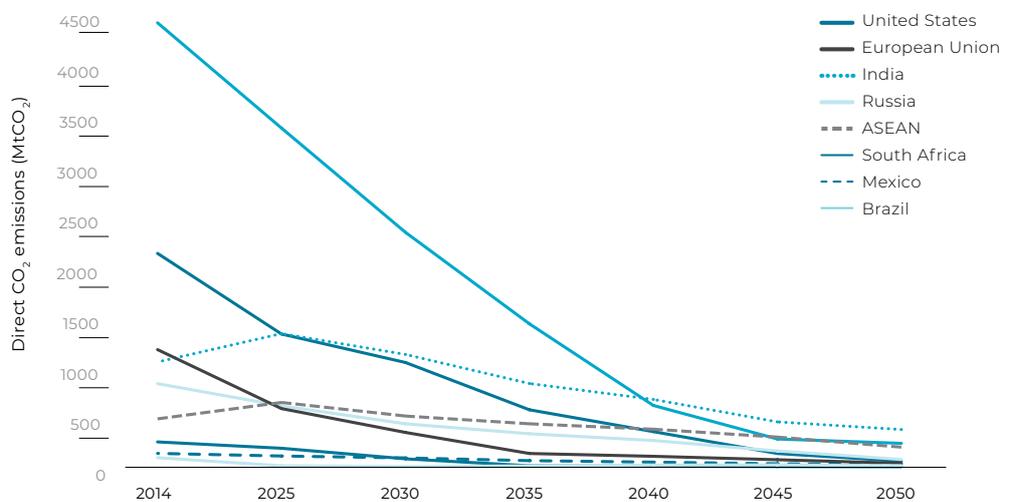
<sup>20</sup> CDP and the We Mean Business Coalition, 2018: Carbon Pricing Corridors – The Market View 2018. Accessible at <https://www.cdp.net/en/reports/downloads/3326>

the electricity sector suggest that CO<sub>2</sub> emission pathways for power generation need to be nearly 100% decarbonized globally by 2050 to keep the average temperature rise below 2°C.

The use of ICP, particularly among power utilities, is already well established. Utilities could use the corridors to assess their potential additional

carbon costs and how the competitive position of their portfolios would be affected in the changing market landscape. The metric can also be used by companies in other sectors, helping improve their business case to transition to alternative energy sources.

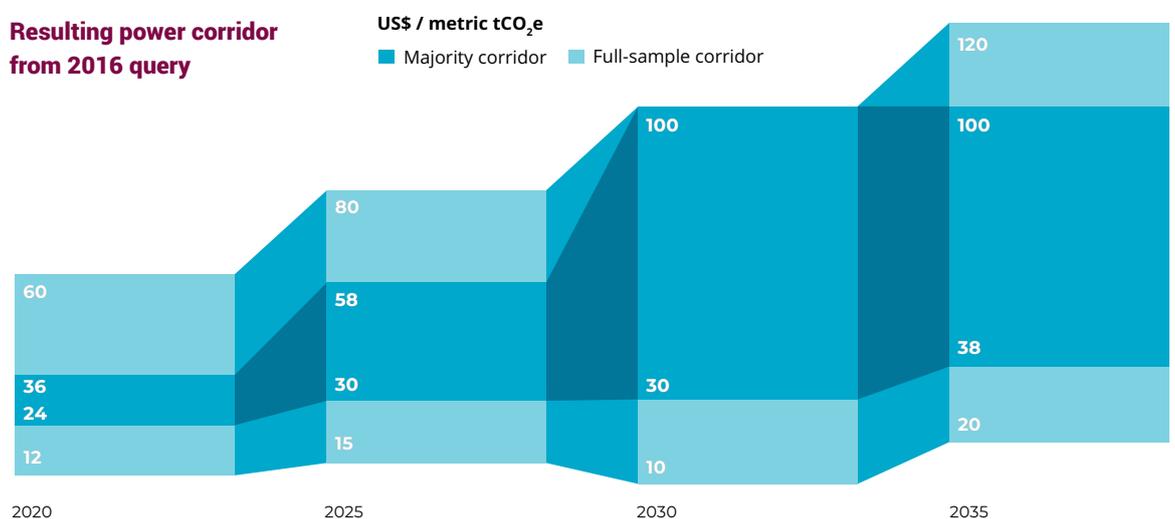
**CO<sub>2</sub> emission pathways for the power sector by region in a 2°C scenario**

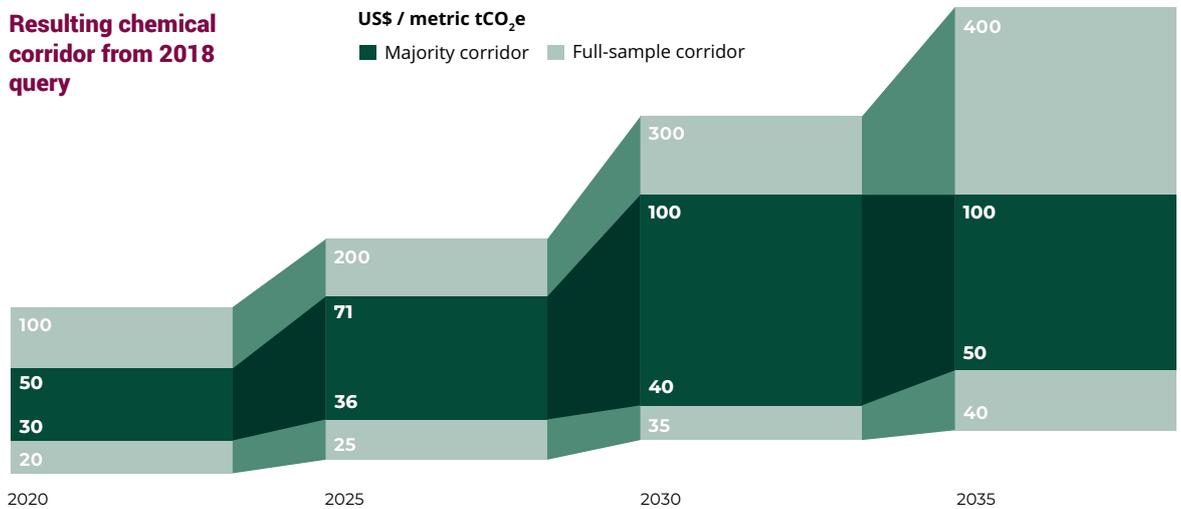


The needed carbon price corridor for 2020 runs from US\$ 24-36/tonne. This forecasted corridor increases to US\$ 30-58/tonne in 2025; to US\$ 30-100/tonne for 2030; and to US\$ 38-100/tonne for 2035. Interestingly, the bottom range of the majority corridor remains around US\$ 30/ tonne

from 2025 onwards. This may be partially due to the expectation that the average cost of renewable energy sources will continue to decrease. A lower carbon price will therefore be needed to make renewable energy competitive with fossil fuel generation.

**Resulting power corridor from 2016 query**





**Note:** upper range of full-sample corridor is not shown to scale

### Chemical sector carbon price signals<sup>21</sup>

The chemical sector is the industry with the largest final energy consumption (28%). Also projected to face significant long-term increase in product demand, the chemical sector has a critical role to play in the economy-wide low-carbon transition.

The needed carbon price corridor for 2020 runs from US\$ 30-50/tonne. This forecasted corridor increases to US\$ 36-71/tonne in 2025; to US\$ 40-100/tonne for 2030; and to US\$ 50-100/tonne for 2035.

The corridor range widens over time, aligning with increased levels of uncertainty around development of political, technological and economic factors. The high end of the full sample corridor represents an outlier perspective among the panel projections. The majority corridor steadily increases across each period, finally stabilizing at US\$ 100 in 2030-2035. This demonstrates a consensus, among a diverse group of panelists, that the carbon price signal needs to strengthen over time.

### EXPERTS OPINION

According to the Stern-Stiglitz report, carbon prices must reach US\$ 40-80 per tonne of carbon dioxide by

2020, and US\$ 50-100 by 2030 to deliver the goals of the Paris Agreement.<sup>22</sup> These prices are suggested under the condition that a sufficiently ambitious climate policy environment is in place.

### IPCC'S 1.5 DEGREE REPORT

According to IPCC' s special report Global Warming of 1.5°C<sup>23</sup>, undiscounted values under a higher-2°C pathway range from 10–200 US\$<sub>2010</sub> / tCO<sub>2</sub>-eq in 2030, 45–960 US\$<sub>2010</sub> / tCO<sub>2</sub> in 2050, 120–1000 US\$<sub>2010</sub> /t CO<sub>2</sub> in 2070 and 160–2125 US\$<sub>2010</sub> /t CO<sub>2</sub> in 2100.

However, estimates for a below-1.5°C pathway range from US\$ 135–6,050/tCO<sub>2</sub>e in 2030, US\$ 245–14,300/t CO<sub>2</sub>e in 2050, US\$ 420– 19,300/tCO<sub>2</sub> e in 2070, and US\$ 690–30,100/t CO<sub>2</sub>e in 2100 (undiscounted values). This is under a pathway to keep peak temperatures below 1.5°C in the 21st century with 50–66% probability. These price ranges are estimates of marginal abatement costs and comprise both prices from policies that put an explicit price on GHG emissions and costs on emissions from other policies.

<sup>21</sup> CDP and the We Mean Business Coalition, 2018: Carbon Pricing Corridors – The Market View 2018. Accessible at <https://www.cdp.net/en/reports/downloads/3326>

<sup>22</sup> Carbon Pricing Leadership Coalition, 2017: Report of the High-Level Commission on Carbon Prices. Accessible at <https://www.carbonpricingleadership.org/news/2017/5/25/leading-economists-a-strong-carbon-price-needed-to-drive-large-scale-climate-action>

<sup>23</sup> Mitigation Pathways Compatible with 1.5°C in the Context of Sustainable Development, IPCC Special report. Accessible at [https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15\\_Chapter2\\_Low\\_Res.pdf](https://www.ipcc.ch/site/assets/uploads/sites/2/2019/02/SR15_Chapter2_Low_Res.pdf)

## INTERNATIONAL ENERGY AGENCY

IEA's World Energy Outlook 2018 discusses different policy scenarios and associated carbon prices.

The Current Policies Scenario assumes that there is no change in today's policies, leading to increasing strains on almost all aspects of energy security, and a rise in energy-related CO<sub>2</sub> emissions. The New Policies Scenario (which has subsequently been renamed as the *Stated Policies Scenario*), includes policies and targets already announced by governments and the situation improves from the previous scenario. Yet, it is still nowhere near the magnitude of change required to meet the goals of the Paris Agreement. The aim of renaming the scenario is to provide a detailed sense of the direction in which existing policy frameworks and today's policy ambitions would take the energy sector out to 2040. It considers only specific policy initiatives that have already been announced.

It is only the third scenario - Sustainable Development Scenario (SDS) - in which accelerated

clean energy transitions put the world on track to meet goals related to climate change, universal access and clean air. Under this scenario, carbon prices reach US\$ 75-100/t CO<sub>2</sub> by 2030 and US\$ 125-140/tCO<sub>2</sub> by 2040. The SDS assumes a higher and broader CO<sub>2</sub> price, rising to US\$ 140/tonne in advanced economies and US\$ 125/tonne in Brazil, China, Russia and South Africa by 2040. These carbon prices apply to power generation, industry and, in some countries, aviation.<sup>24</sup>

In addition, IEA's 450 ppm scenario uses CO<sub>2</sub> prices of up to US\$ 140 per tCO<sub>2</sub> in 2040. Their Beyond 2°C Scenario (B2DS) scenario sees it rise to over US\$ 500 in some sectors (Energy Technology Perspectives 2017 report, p217).

In other words, while all the models use some form of a carbon price to drive emissions reductions, the prices vary enormously.

The table below is an excerpt from IEA WEO 2018 which shows indicative prices in various regions and sectors in 2025 and 2040.

### CO<sub>2</sub> prices in selected regions by scenario as of 2017 (US\$ per tonne) – WEO 2018 (Source: IEA)

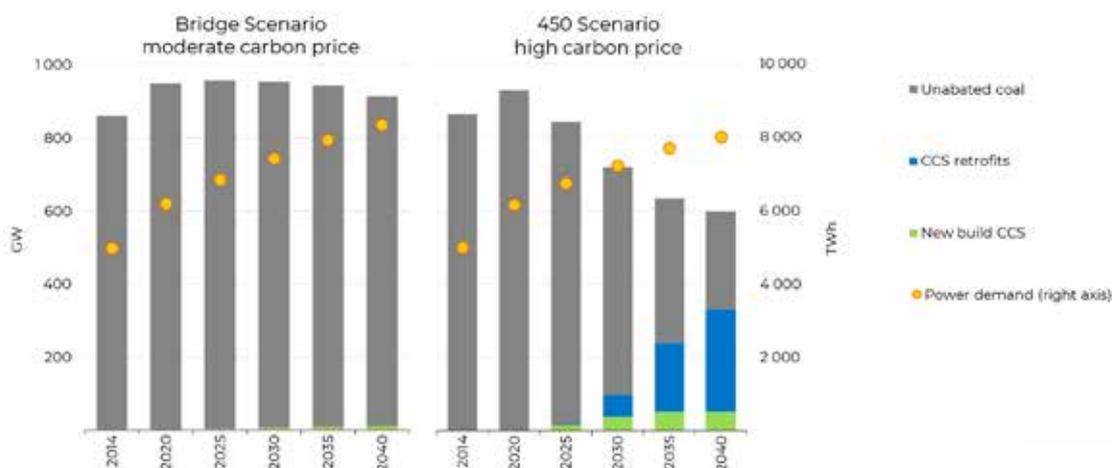
Region	Sector	2025	2040
<b>Current Policies Scenario</b>			
Canada	Power, industry, aviation and others*	35	39
Chile	Power	5	5
China	Power	15	31
European Union	Power, industry, aviation	22	38
Korea	Power, industry	22	39
<b>New Policies Scenario</b>			
Canada	Power, industry, aviation and others*	35	39
Chile	Power	8	20
China	Power, industry, aviation	17	36
European Union	Power, industry, aviation	25	43
Korea	Power, industry	25	44
South Africa	Power, industry	11	24
<b>Sustainable Development Scenario</b>			
Advanced economies	Power, industry, aviation**	63	140
Selected developing economies	Power, industry, aviation**	43	125

\* In Canada's benchmark/backstop policies, a carbon price is applied to fuel consumed in additional sectors.

\*\* Coverage of aviation is limited to the same regions as in the New Policies Scenario

Note: Reproduced exactly as in the IEA report, no CDP ownership rights.

**Carbon price scenario and their effect in China installed coal fired power generation capacity (Source: IEA)**



Reproduced exactly as in the IEA report, no CDP ownership rights.

The prices mentioned in the scenarios are far above most current domestic carbon prices, but can be indicative for voluntary ICP to align with energy and climate modelling.

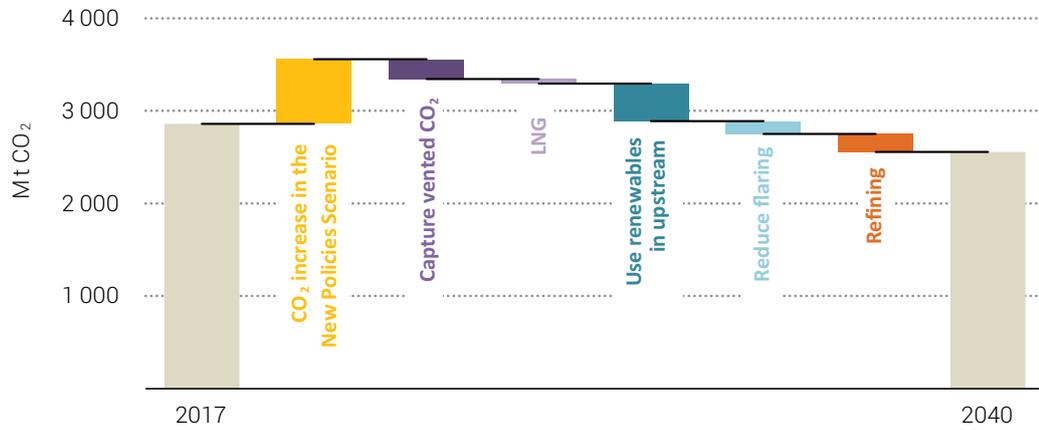
For example, BP carries out scenario modelling and publishes the 'Energy Outlook'<sup>25</sup> to aid not only BP's analysis and decision making, but also as a contribution to the wider debate. In their analysis, BP has used the IEA WEO 2018 new policies scenario to compare with their evolving transition (ET) scenario and the IEA WEO 2018 SDS to compare with their rapid transition scenario. The BP Energy Outlook anticipates a rise in carbon prices prompting a shift in the fuel mix, particularly in industry. This shift will be away from coal towards gas and power, with an increase in the use of carbon capture use and storage in the industrial sector. Most importantly, in the rapid transition, carbon prices are increased to US\$ 200 per tonne of CO<sub>2</sub> in OECD countries and US\$ 100 in non-OECD countries by 2040; compared with US\$ 35-50 in OECD and China (and lower elsewhere) in the ET scenario.

The IEA scenarios also indicate how a robust carbon price in the power generation industry drives deployment of low-carbon fuels, increased efficiency, carbon capture and storage (CCS) and early retirement of high-emission assets. Study has seen, for example, that high carbon prices in China would have a significant effect in reducing coal-fired power generation without CCS, particularly after 2025, as shown in figure above.

It also shows that a carbon price of US\$ 50 per tonne of CO<sub>2</sub> is already used by some oil & gas companies to screen projects. If this same price were to be applied across supply chains, it would cut CO<sub>2</sub> emissions in 2040 by over 1000 Mt CO<sub>2</sub>. Combined with reductions in methane emissions, a total savings of over 2500 Mt CO<sub>2</sub> could be realized in 2040. This is equivalent to India's current energy-sector GHG emissions.

<sup>25</sup> BP (2019), BP Energy Outlook: 2019 edition. Available at <https://www.bp.com/content/dam/bp/business-sites/en/global/corporate/pdfs/energy-economics/energy-outlook/bp-energy-outlook-2019.pdf>

**Impact of a US\$50/t tax on indirect oil & gas CO<sub>2</sub> emissions in the New Policies Scenario WEO 2018**  
 (Source: IEA)



*Extending the price on CO<sub>2</sub> already applied by many international oil companies to the oil and gas supply chains could yield reductions of 1 000 Mt CO<sub>2</sub> by 2040*

*Reproduced exactly as in the IEA report, no CDP ownership rights.*

## THE POLICY LANDSCAPE IN INDIA AND GLOBALLY

Of 181 countries, India is the fifth most vulnerable to the effects of climate change<sup>24</sup>, with its poorest residents being the most at risk. The intensity of these impacts is on the rise, with increasingly irreversible consequences. In order to address this, India ambitiously introduced eight goals under the National Action Plan on Climate Change (NAPCC) in 2008 and is also committed to Nationally Determined Contributions (NDC) as a Party to the Paris Agreement.

The country has thereby introduced various quantifiable targets to fast-track climate actions alongside meeting development needs.

- ▶ India's national commitment is to reduce the emissions intensity of its GDP by 33 to 35% by 2030 relative to its 2005 levels. In the Second Biennial Update (BUR) report submitted to the UNFCCC, the country has already achieved a reduction of 21% in its emission intensity of its GDP over the period of 2005-2014.<sup>27</sup>
- ▶ In addition, the country pledged to achieve 40% cumulative electric power installed capacity from energy sources not based on fossil fuels by 2030. The current share from non-fossil fuel-based electricity generation has been around 35.5% as on June 2018 with the total contribution of 23.02 GW from solar energy alone.
- ▶ Lastly, India also pledged to create an additional carbon sink of 2.5 to 3 billion tons of CO<sub>2</sub> equivalent through additional forest and tree cover by 2030.

The performance of the country in achieving these targets has mainly been successful by introducing various regulations, policies and innovative mitigation instruments across sectors. While India is among the few countries that has put forth 1.5° compatible targets, the government is also considering developing long-term growth strategies for the period

of 2030-2045<sup>28</sup>. Moreover, post the release of IPCC Special Report in October 2018, there has been a rapid and pressing need to raise ambitions and ramp up actions worldwide.

As per the Climate Change Performance Index (CCPI) 2020, an independent monitoring tool for tracking the climate protection performance of 57 countries and the EU, India has been ranked in 9<sup>th</sup> place. This is a jump of two places from last year's ranking. India is progressively improvising its' climate policies and is moving towards introducing new mechanisms for various other carbon intensive sectors such as steel and cement.<sup>29</sup> Further, at the 2019 UN Climate Action Summit, the Prime Minister announced an increase in the renewable target from 175 GW to 450 GW by 2030<sup>30</sup>, with a focus primarily on the solar, biomass and wind energy sectors. This will help to ramp up the renewables share in the current electricity mix and provide access to affordable and clean power at large scale.<sup>31</sup>

To achieve these goals, India has highlighted the need for climate financing, technology transfer at affordable costs and capacity building as means of implementation. Currently, climate pledges under the Paris Agreement covers just one-third of the emissions reductions that are required to keep temperatures below 2°. Therefore, all countries have been urged to raise ambitions over the coming decade, and reflecting in their NDCs by 2020.

26 GermanWatch, 2019: Global Climate Risk Index 2020. [David Eckstein, Vera Künzel, Laura Schäfer, Maik Winges et al] Available at [www.germanwatch.org/en/crri](http://www.germanwatch.org/en/crri)

27 MoEFCC. (2018). India: Second Biennial Update Report to the United Nations Framework Convention on Climate Change. Ministry of Environment, Forest and Climate Change, Government of India. Accessible at <https://unfccc.int/sites/default/files/resource/INDIA%20SECOND%20BUR%20High%20Res.pdf>

28 <https://climateactiontracker.org/countries/india/current-policy-projections/>

29 Germanwatch Climate Change Performance Index 2020 India Country Scorecard. Accessible at <https://www.climate-change-performance-index.org/country/india>

30 "India on track to achieve 175 GW of renewable energy by 2022." The Economic Times, October 16, 2019. Retrieved from <https://economictimes.indiatimes.com/small-biz/productline/power-generation/india-on-track-to-achieve-175-gw-of-renewable-energy-by-2022-government/articleshow/71614562.cms?from=mdr>

31 MoEFCC. (2019, December 20). Outcome of COP25 balanced, with the exception of Climate Finance issues [Press release]. Retrieved from <https://pib.gov.in/PressReleseDetail.aspx?PRID=1597047>

There appears to be a reluctance to adopting economy-wide carbon pricing as its not a 'one-size-fits-all' solution. Properly executed environmental regulations and market-based mechanisms have the potential to trigger innovation offsets, leading to improvement and a win-win situation. This is both in terms of environmental protection and generating profits and competitiveness through improvement of products or production processes. Lately there is a proposal in the US to initiate carbon dividend policy frameworks that can yield maximum benefits back to stakeholders and managers. It has been envisaged that major emitters like China and India can follow such approaches to adopt carbon pricing in the country to effectively reduce emissions.

## INTERNATIONAL CARBON MARKETS

### Progress on carbon markets under the Paris Agreement: Article 6

Within Article 6, Article 6.2-6.3 deals with voluntary cooperative approaches to reduce GHG emissions through direct bilateral cooperation among countries to generate or transfer internationally transferred mitigation outcomes (ITMOs). This helps countries to meet their nationally determined goals. Article 6.4 proposes a new market mechanism for attaining GHG emission reductions alongside meeting sustainable development goals, informally known as the sustainable development mechanisms (SDM).

After COP25 in Madrid in 2019, deliberation on these critical areas has experienced a slowdown. The rules, modalities and procedures for the Article 6 were not finalized and are still to be negotiated by Parties. These are key mechanisms to mobilize finance and support for climate goals, particularly for the most at-risk nations.

Deliberation pertaining to Article 6 was largely around the rulebook for shaping the carbon markets, other forms of bilateral and multilateral agreements for carbon trading, and the scope of these mechanisms. India voiced its opinions on various issues at

stake, with an emphasis on the inclusion of Clean Development Mechanism (CDM) projects and credits under the Article 6 mechanisms. The other key issues were around the accounting rules to prevent double counting and ensuring environmental integrity, the transitional arrangements of erstwhile market mechanisms under article 6 and the share of proceeds for adaption for vulnerable nations.

Yet, with no substantial outcomes pertaining to its rulebook at COP25, it has led to disappointment for vulnerable nations. It should be noted however that the principles of preventing double counting and ensuring environmental integrity are absolutely critical in order to maintain the integrity of the entire Paris Agreement.

Global business has also been pushing for clear agenda/guidance on article 6; supported with strong and coherent long-term policies to direct investments towards climate action through implementation, innovation, and low carbon technologies.

The technical issues under Article 6 are ambiguous at present and texts pertaining to the rulebook full of jargon and political subtext. Yet, many from the corporate sector are leading the way to pursue the 1.5-degree goal. This was evident at the launch of the Climate Ambition Alliance at the 2019 UN Climate Action Summit. The Summit brings together countries, business, investors, cities and regions that are working towards achieving net zero CO<sub>2</sub> emissions by 2050. 786 companies are currently participating in this alliance to push forth the climate agenda and communicate long-term low emission growth.<sup>32</sup>

Apart from this, **Business Ambition for 1.5 degree-Our only future** is a campaign that includes 177 companies across 36 sectors, together representing global market capitalization of over US\$ 2.8 trillion<sup>33</sup>. They have announced their intent to set targets<sup>34</sup> through the science-based targets initiative (SBTi)<sup>35</sup>.

<sup>32</sup> COP25. (2019, December 15). COP25 Closing Balance [Press release]. Retrieved from <https://www.cop25.cl/#/cop-news/zkzflid16EMMxfnQgwhS>

<sup>33</sup> COP25. (2019, December 11). At COP 25, Corporate Climate Movement Grows as New Companies Announce Plans to Align with a 1.5°C Future [Press release]. Retrieved from <https://unfccc.int/news/at-cop-25-corporate-climate-movement-grows-as-new-companies-announce-plans-to-align-with-a-15degc>

<sup>34</sup> 31 Targets adopted by companies to reduce greenhouse gas (GHG) emissions are considered "science-based" if they are in line with what the latest climate science says is necessary to meet the goals of the Paris Agreement – to limit global warming to well-below 2°C above pre-industrial levels and pursue efforts to limit warming to 1.5°C.

<sup>35</sup> <https://sciencebasedtargets.org/>

## DEFINING CLEAN DEVELOPMENT MECHANISM POST 2020: LINKAGE TO ARTICLE 6

Article 12 of the Kyoto Protocol defined CDM, facilitating trade through emission reduction projects in developing nations. The trading of the emissions is through sellable certified emission reduction (CER) credits which can be accounted towards achieving Kyoto targets. This mechanism has been operational since 2006 and is now in its last phase of the second commitment period, which ends in 2020.

The transitional arrangements of the CDM in Article 6 of the Paris Rulebook were primarily urged by developing nations who highlighted concerns regarding unused CERs. Currently, around 0.8 billion CERs (about 42% of the total issued CERs) have not been used and the potential supply is estimated to reach 4.7 billion CERs by the end of 2020.<sup>36</sup>

While the transition of the system could support increased finance flows to climate mitigating activities, others have expressed concerns that it might undermine the creation of new and additional mitigation activities.<sup>37</sup>

Nevertheless, the current draft texts and decisions pertaining to carrying over CDM highlight that it may persist post 2020.

## EUROPEAN UNION: EMISSIONS TRADING SCHEME (EU ETS)

The European Union Emissions Trading Scheme (EU-ETS) is the region's main market trading mechanism. Introduced in 2005, it forms the pillar of the climate change policy of Europe and is one of the largest carbon trading markets. The mechanism is now in its third phase and its structure will change in the fourth phase which will begin in January 2021. The system covers emissions from power, industrial and aviation sectors (flights limited to Europe Economic Area). It includes more than 11,000 power plants, and manufacturing installations. The current allowance

price (per t/CO<sub>2</sub>e) is around US\$ 18.76 as on 5th September 2019.

The main target of the mechanism is to reduce emissions 20% below 1990 GHG levels by 2020; 40% by 2030; and 80-95% by 2050. The current third phase involves a single EU-wide cap for stationary sources which amounts to 1855 MtCO<sub>2</sub>e carbon emissions in 2019. It has been estimated that the total use of credits for phase 1 and 2 may amount up to 50% of the overall reduction that is around 1.6 Gt CO<sub>2</sub>e. It generated a revenue of US\$ 16.8 billion in 2018 alone. 50%<sup>38</sup> of the revenue should be used for climate and energy related purposes, but it has been estimated that they currently spend approximately 80% on the domestic and international climate-related purposes.

Looking forward, The European Commission has launched the European green deal roadmap to make EU economically sustainable and become the first climate-neutral continent by 2050. It is inclusive of all sectors including transport, building, agriculture and energy production. It is meant to foster finance through both public and private sectors. Besides this, EU also plans to execute a Carbon Border Tax in compliance with World Trade Organization rules known as the '*Border Carbon Adjustment (BCA)*' to avoid carbon leakage from carbon intensive production outside the EU.<sup>39</sup> The plan is to impose this border carbon tax on the steel, cement and aluminum sectors in 2021, where importers from these sectors would have to buy CO<sub>2</sub> emission allowances in the European Union.<sup>40</sup>

## CORSIA – UN'S PLAN TO OFFSET AVIATION SECTOR GROWTH

In 2013, the International Civil Aviation Organization (ICAO) introduced a market-based mechanism called CORSIA to reduce emissions from all international flights and attain carbon-neutral growth of the international aviation sector from 2020 onwards. As a hard-to-abate sector, making carbon trade-offs is recognized as one of the measures to address

36 Analysing key technical issues for markets negotiations under Article 6 of the Paris Agreement. Accessible at from [http://www.oecd.org/environment/cc/Article%206%20Thinkpiece\\_COM\\_ENV\\_EPOC\\_IEA\\_SLT\(2019\)3.pdf](http://www.oecd.org/environment/cc/Article%206%20Thinkpiece_COM_ENV_EPOC_IEA_SLT(2019)3.pdf)

37 Lo Re, L. and M. Vaidyula (2019), "Markets negotiations under the Paris Agreement: A technical analysis of two unresolved issues", OECD/IEA Climate Change Expert Group Papers, No. 2019/03, OECD Publishing, Paris, <https://doi.org/10.1787/99d9e615-en>.

38 EU Emissions Trading System (Updated 23 December 2019). © 2019 by International Carbon Action Partnership (ICAP). Retrieved from [https://icapcarbonaction.com/en/?option=com\\_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=43](https://icapcarbonaction.com/en/?option=com_etsmap&task=export&format=pdf&layout=list&systems%5B%5D=43)

39 A Union that Strives for More. Political Guidelines for the Next European Commission 2019-2024. Accessible at <https://www.europarl.europa.eu/resources/library/media/20190716RES57231/20190716RES57231.pdf>

40 Coren, Micheal J. 2010. "The EU's Green Deal wants to use its economic might to compel global emission cuts." Quartz, December 19, 2019. Retrieved from <https://qz.com/1771267/a-border-tax-in-the-eu-green-deal-might-force-global-carbon-cuts/>

the issue. CORSIA is a 3-phased implementation mechanism. Countries voluntarily participate in the pilot phase (2021–2023) and/or the first phase (2024–2026), albeit in voluntary form until 2027, unless exempted. The small island developing states, landlocked and least developed countries have been exempted from the scheme. Besides this, all countries that have more than 0.5% share in the international aviation activity in 2018 are covered under the scheme. Currently, 81 ICAO states representing 76.63 % of international aviation activity intend to voluntarily participate in CORSIA from its outset, but this does not include the major emitters: China, India and Russia.<sup>41</sup>

ICAO has established 11 program design elements and 8 carbon program offsetting assessment criteria under the Emissions Unit Criteria (EUC) that need to be met for the requirement. 13 programs including Clean Development Mechanism and Forest Carbon Partnership Facility have submitted applications that are currently being assessed by the Technical Advisory Board (TAB).

The monitoring, reporting and verification procedure of CORSIA has already started as of 1st January 2019 with airlines monitoring fuel consumption based on classification of routes, alternative methods for calculation of emissions and changing requirements every year.

While India is currently not participating in the scheme, Indian airlines operating internationally will have to offset their carbon emissions starting 2027 (the mandatory phase). This will have significant implications on the growth of Indian carriers considering their breakeven growth even in the current scenario.

## **PARTNERSHIP FOR MARKET READINESS (PMR)**

The implementation of partnership for market readiness (PMR) was initiated at COP25. This will facilitate the design, pilot and implementation of carbon pricing and market instruments in 10 developing countries. It further facilitates 20 emerging economies that collectively account for

40% of global GHG emissions<sup>42</sup> to put a fair price on carbon, while safeguarding competitiveness and promoting long-term decarbonization strategies. As part of the PMR initiative, the World Bank in consultation with the Ministry of Environment, Forests and Climate Change (MoEFCC), Govt. of India has initiated the following pilot studies:

- ▶ Roadmap and action plan for implementation of the market-based instrument for greenhouse gas reduction for municipal solid waste (MSW) sector;
- ▶ Roadmap and action plan for implementation of the market-based instrument for greenhouse gas reduction for micro, small and medium enterprises (MSME) sector; and
- ▶ System assessment and design of a national meta-registry to support cost-effective greenhouse gas reduction in India.

During the 20<sup>th</sup> Partnership Assembly meeting, held in Brussels in May 2019, MoEFCC announced the pilot of the proposed Market-based Instrument (MBI) in MSME sector, in consultation with the MSME sector.

However, none of the other announcements are being taken forward. Due to the complex nature of the MSW sector in India, MoEFCC has decided not to proceed with piloting an MBI in the MSW sector. Further as no MBI had been clearly identified which could be piloted soon, MoEFCC has decided to not proceed on establishing a meta registry.

<sup>41</sup> International Civil Aviation Organization's Carbon Offsetting and Reduction Scheme for International Aviation (CORSIA). Retrieved from <https://www.icao.int/environmental-protection/CORSIA/Pages/state-pairs.aspx>

<sup>42</sup> World Bank. (2019, December 10). At COP25, the World Bank Announces Global Partnership for Implementing Carbon Markets [Press release]. Retrieved from <https://www.worldbank.org/en/news/press-release/2019/12/10/at-cop25-the-world-bank-announces-global-partnership-for-implementing-carbon-markets>

## EXPERIENCE OF NATIONAL MARKETS

### Perform, Achieve and Trade (PAT)

The Perform, Achieve and Trade scheme was introduced under the National Mission on Enhanced Energy Efficiency (NMEEE) as a regulatory mechanism to reduce energy consumption through certification. The main goal of the mechanism was to increase energy efficiency and promote energy savings which obliquely proved beneficial to achieving emission reduction targets. Currently, there are 737 DCs (Designated Consumers) across 13 sectors participating under the PAT scheme.

PAT Cycle-1, initiated in 2015, covered eight sectors aiming to reduce the specific energy consumption of 478 designated consumers. The cycle concluded with overall energy savings of 8.67 MTOE (a 30% over-achievement of total target). The overall energy savings led to 31 million tonnes of avoided CO<sub>2</sub> of avoided emissions.

In PAT Cycle-II, more sectors were incorporated along with the addition of new DCs on a rolling basis. It aimed at energy savings of 8.869 MTOE for 621 DCs across 11 sectors. The 3rd and 4th Cycle operating from 2017-18 and 2019-20 sought to achieve an overall emission reduction of 1.06 MTOE with target assigned to 116 DCs from six sectors viz. thermal power plant, cement, aluminum, pulp and paper, iron and steel and textiles, the cumulative energy consumption of which is estimated at 36 MTOE. The forthcoming cycle of PAT V starting from 2021-2022, envisages including commercial building sectors, petrochemicals and others listed in the Energy Conservation Act, 2001.

### Renewable Energy Certificate (REC)

Renewable purchase obligation (RPO) is one of the policy initiatives taken by the Ministry of New and Renewable Energy, Government of India and State Nodal Agencies. Its aim is to achieve the 175 GW renewable target by 2022. According to the Electricity Act 2003, the State Electricity Regulatory Commissions (SERC) are required to fix a minimum percentage of utilization from renewable energy

sources. Subsequent amendments of the Tariff Policy in 2016 mandate SERCs to purchase solar energy that helps meet 8% of the total energy consumption by 2022.

Considering the fact that most states lack high renewable potential, this initiative facilitates the less resourceful states to meet the mandated RPO by purchasing renewable energy certificates generated by solar and non-solar projects located elsewhere. The renewable energy certification process enables trading of RECs through two power exchanges: IEX -the Indian Energy Exchange and PXIL - Power Exchange India Limited. Around 57 crore RECs have been issued as on October 2019. 1014 RE generators have been accredited as on 3rd October 2019, while 956 RE generators have been registered under the REC mechanism. These registrations and certification processes are conducted through a central level agency - Central Electricity Regulatory Commission (CERC).

Recently, an IT portal has also been launched to disseminate updated information related to the RPO status and its compliance across states.<sup>43</sup> It is a centralized platform to increase accessibility and transparency, providing data on RPO compliance of different states. It allows for verification of the data and to analyze the effectiveness of the regulations. The sale of the RECs experienced a downward trajectory of around 22% on IEX and PXIL over 2017-18, mainly due to short supply of solar and non-solar RECs<sup>44</sup>.

### Gujarat Air Pollution Cap and Trade Program

To overcome the persistent issue of air pollution, the Government of India launched a pilot scheme incorporating trading of particulate matter which is specifically emitted from stationary sources. The program was launched in 2019 in Surat by the Gujarat Pollution Control Board (GPCB), primarily because of the large number of highly polluting manufacturing units operating in their industrial cluster. The Government has set a cap on emissions from all industries, but allows trade and selling of permits. The cap is based on the total mass of the pollution that industries can collectively emit over a

<sup>43</sup> National Portal for renewable Purchase Obligation, <https://rpo.gov.in/>

<sup>44</sup> "Green Certificates sales down 22 per cent in 2018-19." The Economic Times, March 31, 2019.

Retrieved from <https://economictimes.indiatimes.com/industry/energy/power/green-certificates-sales-down-22-per-cent-in-2018-19/articleshow/68661014.cms?from=mdr>

period of time, limiting each industry to emit until a certain limit (capping). Beyond the cap, they have to buy permits on National Commodity and Derivatives exchange Limited (NCDEX). This trading scheme will act as an ancillary mechanism in meeting the goal to reduce air pollution by 20% to 30% by 2024, a goal under the National Clean Air Programme.<sup>45</sup>

### Forest Management Certification Standard (FMCS) and Carbon Registry

In 2015, The Network for Certification and Conservation of Forests (NCCF) in association with several other ministries and industry bodies initiated an India-specific Forest Management Certification Standard (FMCS). This was developed further in 2017 to overcome the issue of state- and privately-owned forests and sustainably manage forests across the country. The primary need was to conserve the forests from deforestation due to extreme commercial use of wood. The standard was based on internationally benchmarked standards that ensure long-term forest management and was developed by the Standards Development Group. The pilot was tested in three primary locations, i.e. Nagaon Forest division in Assam, Dandeli Forest Division in Karnataka and Hoshangabad Forest Division in Madhya Pradesh to test the applicability and adaptability.

Besides the certification mechanism, NCCF is also developing a carbon registry in India which will serve as a database for the listing, trading and tracking of emission reductions, removal standards and the overall achievement of NDC targets in the country.<sup>46</sup>

### Carbon pricing for hard-to-abate sectors

Aiming for a decarbonized economy implies reducing emissions from all sectors, even those where the cost of reducing emissions are very high. The hard-to-abate sectors have been recognized as the highest contributors of GHG emissions, but are in a state of 'carbon lock-in'. This is mainly because technological transformation here requires huge financial investments.

Irrespective of low transformation potential, various company-level initiatives are being leveraged. These include internal carbon pricing, that not only makes business sense but contributes towards emissions reductions. ICP has been a key instrument in the decarbonization of the hard-to-abate sectors, including steel, cement, building, heavy duty transportation, plastics, glass and aluminum.

Measures to transition to the best-available technology and to set science-based targets are increasingly being adopted. In the absence of common regulatory requirements for carbon emissions, however, the primary barrier for the uptake of ICP is the fear of reduced economic competitiveness. Moreover, carbon leakage is another major fear that deters political buy-in to put a price on carbon at national level.

Some companies in the hard-to-abate sector are addressing emission reductions through effective carbon pricing. Ambuja Cement, for example, has the highest Internal carbon price of US\$ 30 per ton of carbon dioxide emissions (tCO<sub>2</sub>e)<sup>47</sup>. Yet, there is often little inclusion of all the small- and large-scale industries within these sectors.

The primary issue with the process of Internal carbon pricing among corporates remains the lack of consistent and clearly defined price setting methodology, which provides clarity and certainty on the impact of the ICP set. Corporates, mainly from the steel and cement sectors in India, have been highlighting the need for targeted policies at the national level, that sends a price signal which can help overcome this uncertainty.

Most of the literature analysis suggests that in this sectoral transition process planning, it is crucial to incorporate key players to structure an effective carbon tax with proper tax base (gases that are aimed at being reduced), proper point of regulation (upstream or downstream), determining the tax rate and essentially avoiding carbon leakage. But most importantly, the distribution and management of the revenue generated through the taxes should be in a judicious and transparent manner and should

<sup>45</sup> Gopal, Sapna. 2019. "Gujarat pilots emissions trading programme to tackle air pollution." Mongabay, September 4, 2019. Retrieved from <https://india.mongabay.com/2019/09/gujarat-pilots-emissions-trading-programme-to-tackle-air-pollution/>

<sup>46</sup> Network for Certification and Conservation of Forests Carbon Registry, <https://www.nccf.in/carbon-registry-india/>

<sup>47</sup> Rastogi, Namrata Patodia / Carbon Pricing Leadership Coalition. (2019, March 14). Gearing Up for Change: Challenges Faced by Indian Private Sector as they take on Carbon Pricing [Press release]. Retrieved from <https://www.carbonpricingleadership.org/blogs/2019/3/14/gearing-up-for-change-challenges-faced-by-indian-private-sector-as-they-take-on-carbon-pricing>

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be more focused on attaining 'revenue neutrality'.<sup>48</sup> Merely putting a price on carbon through policy interventions will not help. Effectiveness needs to be enabled across the supply chain to create an overall transformational change.

Various international organizations have now defined structured mitigation efforts by sectors. For instance, within the shipping sector, the international maritime organization (IMO) is committed to reducing its emission per transport by at least 40% by 2030, followed by a further 70% reduction by 2050, as compared to 2008 levels. Further, IMO is focusing on reducing its emission intensity through energy efficiency, aiming to peak its emissions by at least 50% by 2050. This target is planned to be achieved through funds generated from shipping companies, which will be directed towards technological advancement, including propulsion systems like fuel cells, batteries and synthetic fuels.

With India being a member of international organizations that are now committing to ambitious mitigation targets, exploring and developing sector level strategic roadmaps are key to meet the obligations at an international level. There have also been suggestions that developing a national trading scheme within India with appropriate sectoral coverage can also significantly help address the issue.

With rising demand and strong market growth, building a sustainable value chain can help companies across sectors contribute to significant emission reductions. The main drivers of carbon pricing are through companies' willingness, the existing policy initiatives and a structured framework for future implementation. Thus, with the growing number of companies, the existing policy framework may require alterations.

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<sup>48</sup> WGMI. 2019. *Mitigation Instruments for Achieving India's Climate and Development Goals: A White Paper by the Working Group on Mitigation Instruments*. New Delhi: Council on Energy, Environment and Water (CEEW) and Environmental Defense Fund (EDF). Accessible at [https://www.ceew.in/sites/default/files/CEEW-EDF-Mitigation-Instruments-for-India%27s-Climate-and-Development-Goals-PDF-14Oct19\\_0.pdf](https://www.ceew.in/sites/default/files/CEEW-EDF-Mitigation-Instruments-for-India%27s-Climate-and-Development-Goals-PDF-14Oct19_0.pdf)

# CORPORATE BEST PRACTICES ON CARBON PRICING

**Name:** Microsoft

**Carbon price:** US\$ 8.03/metric ton (internal fee)<sup>49</sup>



## How Microsoft incorporated an internal fee

1. Calculate carbon impact: First they calculated their **carbon emissions inventory** which forms the basis for any carbon related policy and used **emission-and-energy tracking software** to improve transparency to provide insight at a granular level.
2. Establish a carbon reduction policy and develop an investment strategy: Microsoft then **identified the accountable stakeholders** i.e. those to be involved in the initial design, financial leaders within the organization etc. They next established an **internal carbon reduction policy** outlining what commitment their organization is making to reduce carbon, which includes scope of the policy, targets etc. The next step is to define the **carbon fee emissions boundary** and its **allocation structure**. This is then followed by developing a **carbon fee fund investment strategy** which entails the investments to be made from the carbon fee collected.
3. Determine ICP: The next step is to finally **set the carbon price**. Microsoft recommends this by dividing the total cost of environmental initiatives portfolio by the emissions within the carbon fee emissions boundary. This is done along with **calculating projected costs by groups** that consume the resources (which are responsible for the emissions).
4. Gain approval and establish governance and feedback loops: Once the design is approved it is important for the model to have **leadership and stakeholder approval**. Microsoft additionally recommends **establishing an internal-cross organization committee** to provide ongoing input & guidance to help stay aware of the successes and challenges,
5. Administer the fee, communicate results, and evolve to increase impact: Next, it is important to **allocate the carbon fee** to determine the appropriate cycle to charge the organizational divisions for the projected emissions. Microsoft then recommends to having a monthly or quarterly update to **true up actual emissions** and costs with the projections being used to provide an opportunity make calibrations where necessary to ensure the internal carbon reduction policy is met. It is extremely important to **communicate progress internally** to make sure the stakeholders are aware that the carbon fee is making an impact. Microsoft also recommends highlighting your strategy and achievements by **reporting on the emissions performance externally**. Finally, with the model running successfully, it is key to **plan for the future** – refine and evolve your approach for maximum value for your organization.

## Can their model be replicated?

The Microsoft carbon fee model is based on a basic universal formula: carbon emissions multiplied by carbon price equals the carbon fee. Since it doesn't require any complex tacking or trading of credits, the model is simple, repeatable, and scalable. It allows for environmental action to be deeply and broadly embedded in both the financial and executive decision-making structures across the organization. It is also simple enough to be transferable, and can be easily be adapted to fit other organizations.<sup>50</sup>

<sup>49</sup> Microsoft 2019 CDP response.

<sup>50</sup> Microsoft, Sustainability, <https://www.microsoft.com/en-us/corporate-responsibility/sustainability>

### Documented success

In 2012, Microsoft implemented an internal carbon fee to help reach its carbon neutrality commitment and advance its renewable energy goals. The fee is applied on the scope 1 and scope 2 emissions from the company's 12 business units, including its global data centers, as well as on a part of its scope 3 emissions. Using the funds collected by the carbon fee, Microsoft has reduced emissions by 15.6 million metric tons of carbon dioxide, invested in more than 28 million megawatt-hours (MWh) of green power,<sup>51</sup> and achieved more than \$10 million per year in energy cost savings<sup>52</sup>.

**Name:** SUEZ

**Reporting year:** Jan 2018 – Dec 2018

**Carbon Price:** EUR30/metric tonne



### How SUEZ incorporated an ICP

SUEZ incorporates an internal carbon price into the business plans of its investment projects, based on pricing trends taken from domestic and/or European regulations (e.g. €30 per tCO<sub>2</sub>e in the European Union in 2030, in accordance with the International Energy Agency's New Policies Scenario). Furthermore, SUEZ uses a higher internal carbon price (€50 per tCO<sub>2</sub>e) in the business plans for low-carbon solutions currently under review as part of its R and D programs to favor low-carbon innovation.

For stress test investments, SUEZ assesses the impact of carbon pricing according to different scenarios:

- Low-price scenario: 7 euros/tCO<sub>2</sub>e
- Realistic scenario: 30 euros/tCO<sub>2</sub>e
- High-price scenario: 50 euros/tCO<sub>2</sub>e

Within project engagement phase, SUEZ integrated forward-looking carbon price scenarios to analyze the positive/negative economic impacts of different technological solutions responding to customer needs based on their respective carbon footprint. Depending on selected carbon pricing trends (cf. variance of price used), SUEZ analyzed both financial risks (e.g. carbon related costs of fossil fuels) and additional revenues for the Group or its customers (e.g. carbon fees from emission reductions).

### Can their model be replicated?

As a model, SUEZ's approach uses varied price levels for different scenarios. The lack of uniformity does make it complicated to follow at first, but also adds value. For companies at initial stages of incorporating an ICP, it will encourage assessment of both positive and negative impacts of the varied price points. This is a good starting point for any ICP activity.

### Documented success

In 2017, several stress tests were conducted to anticipate the impact of carbon pricing regulations on waste management projects (for instance, the substitution of a fossil fuel powered plant by a waste-fueled boiler in an industrial park and a waste-to-methanol plant in Spain). Suez identified several projects eligible to such mechanisms. The Group compared several options including the accreditation of some projects under Voluntary Carbon Offsets (VCS), Certified Emission Reductions (CERs) as well as Paris Agreement

<sup>51</sup> <https://www.microsoft.com/en-us/environment/carbon>

<sup>52</sup> UNFCCC. Microsoft Global Carbon Fee [News]. Retrieved from <https://unfccc.int/climate-action/momentum-for-change/financing-for-climate-friendly/microsoft-global-carbon-fee>

Sustainable Development Mechanism (SDM). Through these mechanisms, SUEZ will be able to sell carbon credits to public & private entities using carbon offsets to meet their carbon neutrality goals or requirements when they cannot eliminate all their own emissions. SUEZ intends to use this forward-looking carbon pricing mechanism in 60% of SUEZ total annual budget-commitments by 2021.

**Name:** Nissan Motor Co Ltd

**Reporting year:** April 2018 – March 2019

**Carbon Price:** 30,000 yen, variance – 5000-80,000 yen across projects



### How Nissan incorporated an ICP

Nissan has ambitious carbon reduction targets of reducing CO2 emissions of global corporate activities by 80% in 2050 compared to FY2005, and reducing CO2 emissions from new vehicles by 90% in 2050 compared to FY2000 levels. In order to achieve these targets, Nissan considers GHG emissions reduction as one of the most crucial parameters in their investment selection process. Proposals are compared and selected based on carbon emissions reduction per unit cost of investment, as well as the energy reduction potential, measured with an ICP.

### Can their model be replicated?

At the heart of this model is the simple idea that any investment must include reducing greenhouse gas emissions. It's easily replicated and practical because it works within the normal organizational structure. Proposals are prepared and compared based on various factors - carbon emission reduction per unit cost of investment or energy reduction measured against their internal price, for example. The best proposals are taken ahead, showing a forward-thinking and risk preparedness mindset that is essential for any climate policy, particularly ICP.

### Documented success

At Nissan, the resources for sponsoring environmental improvements in terms of CO2 emissions reduction are negotiated with manufacturing plants, and prioritized/implemented according to carbon price or unit cost to reduce CO2 emissions and timescale for return on investment (ROI). As a general rule, projects with large potential for CO2 reductions, relatively low investment cost and short ROI are prioritized. One of the signature projects is The Nissan Energy Saving Collaboration (NESCO) which received Chairman's Prize of ECCJ (Energy Conservation Center, Japan) in 2016 for its energy-saving activities across the company. It demonstrates Nissan's continuous effort in adopting an ICP in improvement activities for achieving carbon reduction. Besides the NESCO activities, Nissan has invested in various types of equipment such as compressors, pumps, air conditioners and illumination, in order to achieve reductions in CO2 emissions. Those investments have cut emissions by about 24,500 tons of CO2 globally in fiscal 2018.

**Name:** Novartis



**Reporting year:** Jan 2018 – Dec 2018

**Carbon Price:** shadow price US\$ 100

### How Novartis incorporated an ICP

It is mandatory to apply the carbon price to capital investments above US\$ 20m with the voluntary option to expand to all capital appropriation requests. These investments are reviewed at the investment committees for Novartis Business Services and Novartis Technical Operations. Carbon emission costs are added as a memo line in the financial summary document for each scenario so decision makers can understand the long-term impact of choices related to carbon footprint.

Novartis leadership has endorsed a carbon price of US\$ 100 per ton (t) of carbon dioxide equivalents, in line with revised estimates of the real cost of carbon over the next decade.

### Can their model be replicated?

Novartis' model reflects the importance of leading from the top, and yet building consensus across the organization. They look at building a carbon price into capital investment decisions, to help identify projects that will most cost-effectively reduce GHG emissions. It starts with high-level oversight and involves actual decision-making before it is executed. The model shows organizations the pertinence of all levels for ICP implementation.

### Documented success

This shadow price of carbon has informed consideration and approval of long-term renewable power purchase agreements and efficiency investments being processed internally.

**Name:** Royal DSM



**Reporting year** – Jan 2018 – Dec 2018

**Carbon Price:** EUR50

### How Royal DSM incorporated an ICP

For DSM, Internal Carbon Price is an important, complementary tool to broader climate actions we take. Currently, DSM has two types of internal carbon prices; (1.) ICP used in business cases for new investments/ acquisitions (2.) In the P&L. Furthermore, the ICP has been essential in paving the way for introducing recent policy and process for carbon neutral investments within business groups.

In practice, ICP has been deployed in the following cases:

1. Investment cases since 2016, when DSM decided to include a carbon price of €50 for each ton of GHG additionally generated as a result of an investment project. In the business case of the project this carbon penalty had to be included as a cash outflow. In practice, for each large investment two business cases have to be presented. One with an internal carbon price of 50 €/t CO<sub>2</sub>e, and one with the real carbon price (which tends to be much lower or even zero depending on the region). The above is not only valid for capital investment projects but also to acquisition projects.

2. DSM has also continued to explore expanding and deepening the used of carbon pricing and more recently in included an internal carbon “penalty” in the P&L of the different units. This penalty is calculated at €50/mt of CO2 eq. multiplied by the actual emissions in the previous period. The charge is only included in the internal management reporting and does not trigger any cash flows between entities but will help to increase the awareness and further drive emissions reductions.

### Can their model be replicated?

Royal DSM’s model is an example of an ICP being used as a preparatory tool for external carbon pricing strategies, making it the basis of investment decision-making for large projects. This is a practical approach for an ICP, and as Royal DSM found, can help prepare organizations for the financial impact of an external carbon price. The investment in internal capacity and awareness building on ICP is also extremely valuable. Such a model can be easily replicated by organizations to help build a successful and smooth ICP system.

### Documented success

At DSM, the rollout of Internal Carbon Pricing (ICP) went smoothly and received broad internal support. Since DSM actively informs its employees on climate action and carbon pricing, a growing number of employees at DSM acknowledge the benefits of ICP and have a general understanding of its use and importance. These efforts were supported by the CEO and CFO, who expressed their support for ICP and carbon pricing in general through both internal and external communication. The implementation of ICP was further supported by integrating it in existing processes and making it a mandatory factor in the financials for large investment decisions. This also helped ensure a pragmatic, simplified approach to successful implementation. Backed by positive results in using ICP, DSM has also taken a strong position to advocate meaningful carbon pricing policies. The DSM CEO is serving in several leading roles to drive carbon pricing, including the World Bank Carbon Pricing Leadership Coalition (CPLC) and as UNGC Carbon Pricing Champion.

Employing an ICP has helped Royal DSM to:<sup>53</sup>

- ▶ Spot energy/cost saving opportunities and stimulate people to think about ‘GHG alternatives’ in early stages;
- ▶ Create awareness on GHG emissions beyond the Operations community and integrate ‘carbon’ language into financial language, making it easier to embrace by business/ financial people;
- ▶ Redirect and/or scale up investments towards low-carbon technologies and low(er) carbon energy sources; and
- ▶ Trigger a long-term mind-set and understanding of future costs/risks; including building the confidence of all stakeholders (incl. investors) that they are getting ready for a future in which carbon will increasingly have a price.

<sup>53</sup> Research Institute of Economy, Trade and Industry (RIETI) Seminar Handout (November 7, 2018). Retrieved from [https://www.rieti.go.jp/en/events/bbl/18110701\\_vreezeze.pdf](https://www.rieti.go.jp/en/events/bbl/18110701_vreezeze.pdf)

## CASE STUDIES OF INDIAN COMPANIES PRICING CARBON

### Hindustan Zinc Ltd.



HINDUSTAN ZINC

**Type of ICP:** Implicit price

**GHG scope:** Scope 1; Scope 2

**Objective for implementing ICP:** Change internal behaviour; Drive energy efficiency; Drive low-carbon investment

**Price:** HZL uses an implicit price of ₹1118.46/tCO<sub>2</sub> which is applicable to all their units.

#### Methodology/Approach:

Hindustan Zinc approached ICP calculation through:

- ▼ Calculation of ICP using 'implicit cost of carbon' methodology
- ▼ Calculation of ICP using 'future cost' methodology

Calculation of the 'implicit cost of carbon' for HZL was done based on the data provided for the energy efficiency measures and the renewable energy projects that were already implemented or commissioned. ICP was calculated based on the abatement method which involved the calculation of the price required for avoiding a tonne of CO<sub>2</sub>e through adoption of EE and RE related measures and respective investments. The calculated 'Implicit cost of carbon' HZL comes out to be INR 1118.46 per tonnes of CO<sub>2</sub> equivalent (US\$ 16).

Calculation of the future cost of the carbon was done by HZL based on two scenarios: BAU emissions -assuming emissions to rise by a CAGR of 2.6%; and emissions as per SBT scenario where HZL has set a target to reduce its absolute Scope 1 & 2 emissions by 14.4% by 2026 below 2016 levels. The emission reduction required to achieve SBT in comparison to BAU scenario was calculated. This included the future cost (in Rs. /tCO<sub>2</sub>e) of the initiatives, such as energy efficiency and renewable energy; along with their lifetime and payback period. Together, this helped arrive at a price per ton of carbon avoided or that would be avoided throughout lifetime of project.

**Application:** ICP helps HZL implement low energy consumption projects in processes and meet the targets set for emission reduction.

#### Evolution of this price in future:

The future price of carbon has been calculated using future data for only one year and it is very likely to change. This might not be restricted to retro-fitting in terms of EE initiatives, but might also involve investing in BAT (Best Available Technology) which will have major impact on the cost and thus on the carbon price.

### Tech Mahindra



**Type of ICP:** Implicit price; Shadow price

**GHG scope:** Scope 1; Scope 2

**Objective for implementing ICP:** Change internal behaviour; Drive energy efficiency; Drive low-carbon investment; Navigate GHG regulations; Stakeholder expectations; Supplier engagement

**Price:** The company has taken Internal Carbon Price of US\$ 10 per MTCO<sub>2</sub> in 2015 with a tax on business units proportional to the resources allocated. This carbon price is the total expenditure for green initiatives divided by emissions.

**Application:** Setting a price on carbon enables Tech Mahindra to test and assess the profitability of projects in different scenarios, to make better decisions to future-proof the business decisions. This also serves to stimulate innovative ideas on how to best allocate capital to deliver higher returns in a low-carbon economy. For these innovative ideas, they run a platform called IRIS to capture these ideas and incentivize the selected ideas. This creates awareness among the employees about the carbon emissions and the hazardous effects caused by them so that the carbon emission at an individual/organizational level can be reduced.

**Impact and Implication:** Tech Mahindra has increased their renewable energy sourcing from 2.8% to 15.2% with respect to last year. Funds from carbon price implementation helped in conserving energy through installation of energy efficient equipment like Sensor, LED, efficient HVAC, efficient coolers and power cables; installation of solar plants and solar water heaters, and renewable energy PPA's. It also helps them in investing in LEED certification, investing in virtual systems to reduce travel and logistics. They've created awareness amongst staff, suppliers and customers through a program called Making Sustainability Personal using various events, seminars and activities towards protecting environment. Carbon Price tool has guided achievement of emission targets, which are approved by SBTi and thus Carbon Price mechanism helps our Business units to also be financially responsible.

## Infosys Limited



**Type of ICP:** Implicit price; plans for Internal fee

**GHG Scope:** Scope 1; Scope 2; Scope 3

**Objective:** Change internal behaviour; Drive resource efficiency; Drive low-carbon investment; Identify and seize low-carbon opportunities

**Price:** At Infosys, a completely funded programme to become carbon neutral is underway since 2011. It was the first IT company at the United Nations to declare a goal of becoming carbon neutral. Infosys reported an internal carbon price of US\$ 10.5 in 2017, which was revised to 14.25/tCO<sub>2</sub>e in 2019.

They assessed the emissions profile across all scopes (1, 2 and 3) and all significant geographies to understand the magnitude of the program that could possibly be addressed through internal carbon price. Based on the sources of emissions, Infosys' strategy to become carbon neutral includes energy efficiency, renewable energy and carbon offsets. Infosys then derived an ICP and the corresponding cost of decarbonisation.

- ▶ Infosys analysed its past and potential future investments in various energy efficiency projects in areas, such as HVAC system, Building Management Systems, UPS systems and lighting systems. Cost of emission reduction and payback periods were key considerations in energy efficiency projects. With 51% reduction in per-capita energy consumption already achieved, Infosys discovered a relatively higher carbon price under this pathway going forward.
- ▶ Infosys evaluated its investments in renewable electricity projects as well as its third-party renewable power procurement agreements. By considering the power requirements at various locations, the prevailing grid power tariff and the levelized costs of captive and purchased renewable power, Infosys derived a cost of carbon under the renewable power pathway.
- ▶ Infosys estimated the cost of offsetting emissions that cannot be avoided. The current investments in carbon offset projects along with a study of the current carbon markets helped Infosys arrive at the carbon price through the offset pathway.
- ▶ Infosys arrived at a weighted average carbon price of US\$10.5 per t CO<sub>2</sub>e in 2017, which was updated to US\$14.25 per t CO<sub>2</sub>e in 2019 based on the investment potential for each of the levers above.

They also wish to explore the option of using the ICP as a basis for internally raising funds from businesses or departments and use the funds for corporate emission reduction programs.

Infosys highlights that it expects an internal price on carbon to deliver the following benefits:

- ▼ Informed management decision on investing in low-carbon projects
- ▼ Effectively achieve emission reduction targets
- ▼ Align operations and investments with the transition to a low-carbon economy

**Application:** Infosys uses the established carbon price to sensitize various business units of their footprints through making each unit educated based on the implicit carbon price and the carbon footprint of each unit. Going forward Infosys plans to create a fund through the implementation of an internal fee.

**Impact and Implication:** The internal carbon price leads to better awareness about emissions and the cost of emissions of the organisation and its units. It also leads to better low-carbon investment decisions

**Variance:** Infosys is evolving its price gradually. Infosys had derived a carbon price of \$10.5 in FY 17 which was further revisited in FY 19. The current carbon price for Infosys is \$14.25 per ton of CO<sub>2</sub>e, which is a weighted average of the price of carbon under the energy efficiency, renewable energy, and emission offset. The price was revisited taking into account how the markets, investments and costings have evolved over time, while also extrapolating the Infosys carbon footprint itself.

## Mahindra & Mahindra



**Type of ICP:** Implicit price; Shadow price

**GHG scope:** Scope 1; Scope 2

**Objective for implementing ICP:** Change internal behaviour; Drive energy efficiency; Drive low-carbon investment; Identify and seize low-carbon opportunities; Navigate GHG regulations; Stakeholder expectations.

**Price:** In FY16, Mahindra & Mahindra became the first Indian company to announce its internal carbon price of US \$10 per ton of carbon emissions (i.e. INR 664/ tCO<sub>2</sub>e (scope 1+2) at fixed 1US\$ = 66.4 INR). This move was in-line with a business commitment to reduce its GHG emissions year on year. They employ uniform pricing i.e. a single price is applied throughout the company.

**Approach and Methodology:** The process of internal carbon pricing started when Mr. Anand Mahindra was invited to join the Carbon Pricing Leadership Panel in 2015 and proceeded through multiple conversations in meetings around the world. They started the price determination process by mapping the initial ratio of annual green investments compared to overall emissions. Estimating and disclosing emissions over several years made it easier for them to analyse data across an extended timeline through the preceding years. Armed and confident with their dataset, the price came out to US\$6-7. Mahindra decided to determine the additional cost that would be required each year to reduce its emissions and plotted the maximum price that it would incur per ton of emissions by mapping out various abatement options in its unique case. This raised the carbon price to US\$10 per ton. They have committed to reduce their carbon intensity by 25% by 2019 against 2016 levels and the investments through the company's carbon pricing mechanism will help it achieve this goal.

**Application:** To decide the allocation of investments to projects, a metric was formed within the business combining reduction in emissions and investments in paybacks and using that metric projects are sorted in descending order of impact investments become easy for them.

**Impact & Implication:** Mahindra & Mahindra made an investment of Rs 30 crores in FY19, 20% higher than FY17, resulting in restricting Scope 1 + Scope 2 (Market-based) emissions to 2,80,120 tCO<sub>2</sub>e which would

otherwise have been 291,292 tCO<sub>2</sub>e. i.e. avoiding 111,120 tCO<sub>2</sub>e by implementing energy and renewable energy projects. In 2016 they decided to switch to complete LED lighting, investing almost US\$4 million and received returns in less than one year. Apart from financial gains, they have garnered immense reputational gains as well.

## Ambuja Cements



**Type of ICP:** Implicit Price

**GHG scope:** Scope 1; Scope 2

**Objective for implementing ICP:** Change internal behaviour; Drive energy efficiency; Drive low-carbon investment; Identify and seize low-carbon opportunities; Navigate GHG regulations; Stakeholder expectations; Stress test investments; To devise offset expenditure (CAPEX)

**Price:** Ambuja Cements use an ICP @ ₹2103/tCO<sub>2</sub> (US\$30.74/tCO<sub>2</sub> where US\$1 = ₹68.422).

**Methodology:** They use True Value which uses Integrated (Economic, Social and Environmental) Profit and Loss Statement (IPL) methodology to assess the initiatives proposed (future investments) to achieve the company's climate targets. This methodology quantifies the equivalent economic value on the social and environmental externalities related to the company's new projects, to raise awareness of how they may or may not affect our business, and to assess their relative importance in the decision-making process. In this process, a list of initiatives are proposed to achieve defined targets. A Social and Environmental PL assessment can be conducted for each of the initiatives, considering a price for carbon and other externalities. Ambuja derived an internal price for carbon using the social cost of carbon methodology published by the EPA. The cost includes human health costs, flood damages, and changes in energy system costs like heating and air conditioning, etc.

They are also in the process of aligning with the Lafarge Holcim's approach on internal carbon pricing thus normalizing the Group's approach to Indian conditions and calculating the internal price of carbon for all their manufacturing locations.

**Impact and Implication:** For their 2018 Scope1 & 2 emissions, the total cost of gross CO<sub>2</sub> emissions came out to be ₹33,627 Million (considering exchange rate, US\$1 = ₹68.422)

## ACC Ltd.



**Type of ICP** - Internal fee; Offsets; Shadow price

**GHG scope:** Scope 1; Scope 2

**Objective for implementing ICP:** Change internal behaviour; Drive energy efficiency; Drive low-carbon investment; Identify and seize low-carbon opportunities; Stakeholder expectations; Stress test investments; Supplier engagement

**Price:** ACC uses a price of ₹3313/tCO<sub>2</sub> (US\$30.16/tCO<sub>2</sub> as a minimum, US\$63.98/tCO<sub>2</sub> as a maximum with an average price of US\$47.33/tCO<sub>2</sub>, and converted @ \$US1 = ₹70).

**Application:** ACC has mentioned that ICP helps them to estimate the economic impact on the production cost of the sites, the efficiency of each production site and the existing and projected market demand. They plan to internalize carbon pricing while making decisions based on the overall financial impact that the asset has and may have in the future.

## LOOKING FORWARD

Strong carbon markets and meaningful pricing signals are chief drivers of innovation and investment. With a carbon price, companies will have the opportunity to expand into cleaner and greener areas; helping to achieve business as well as environmental goals in an efficient way. CDP's multi-year trends have shown that a carbon price encourages clean technology and market innovation, stimulating new, low-carbon drivers of economic growth, while showcasing green and profitable growth for a company. Companies have good reason to be engaged.

Climate change poses material risks to business – whether from supply chain disruption from extreme weather; regulatory risk as governments and cities ramp up action; or damage to brands as consumers increasingly demand transparency and assurance of sustainability. In such a risk-strewn scenario, carbon pricing has the power to lead the way in the transition to a sustainable low-carbon economy that safeguards the global commons.

Currently, India has not defined any carbon price, nor has it signaled policy in that direction, though a carbon market pilot is sometimes mentioned. While the cess on coal has often been acknowledged as a form of carbon tax in the past, the proceeds of the fund have not been deployed for carbon mitigation essentially removing any climate co-benefits.

As companies prepare for the brave but uncertain future in the battle against climate change, many leading corporations along with select regions are using a price on carbon to internalize the otherwise invisible costs of GHG emissions. For the corporate world, it serves as an important risk mitigation tool against a carbon-constrained future which could bring either new taxes or myriad forms of market-based mechanisms to curb emissions. Companies' pricing initiatives have various objectives. Increasing global market value and competitiveness is one. Incorporating B2B customer preferences is another, as many of these companies fall into the supply chain of global corporations leading in sustainability.

Even though COP25 fell short of what was needed, there was intensifying momentum from non-state actors on climate action, with the corporate world

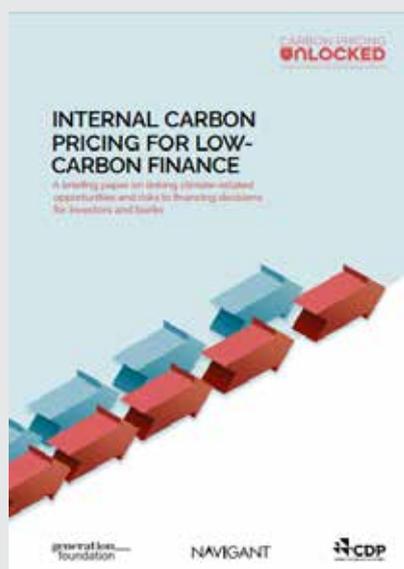
calling for increased action and ambition from governments. As per the recent IMF Fiscal Monitor<sup>54</sup>, a carbon tax of US\$50 per tonne of CO<sub>2</sub> in just the G20 countries can prevent 6,00,000 premature air pollution deaths annually by 2030. In India, it would also account for an estimated 15% of CO<sub>2</sub> reductions (compared with baseline levels) from G20 countries.

Countries around the world have set targets to reduce their emissions by 2030 in line with the Paris Agreement. At this time, the importance of the role played by companies in driving sustainable business models that supplement national and global efforts is greater than ever before. Assigning a monetary value to the cost of carbon helps companies monitor and adapt to real-time and potential future shifts in the external market.

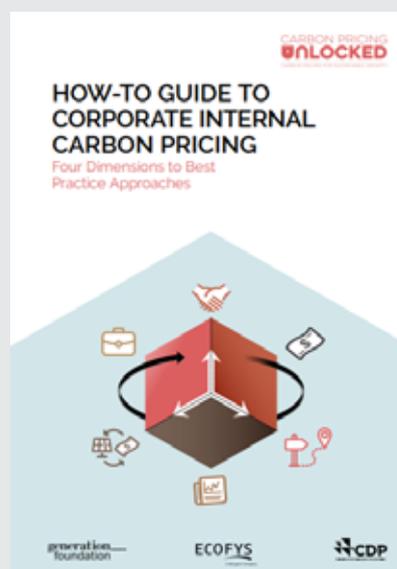
<sup>54</sup> International Monetary Fund (IMF). 2019. Fiscal Monitor: How to Mitigate Climate Change. Washington, October. Accessible at <https://www.imf.org/en/Publications/FM/Issues/2019/09/12/fiscal-monitor-october-2019>

## FURTHER RESOURCES

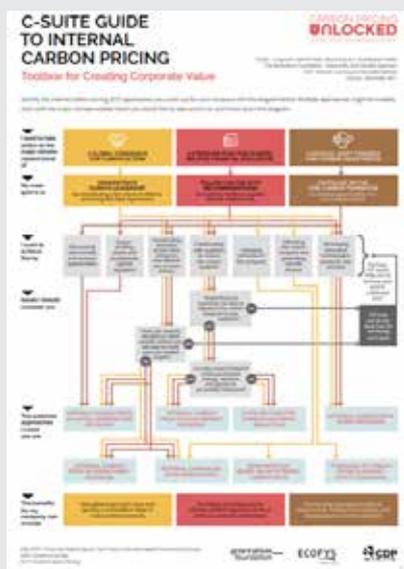
CDP has dedicated pages for Carbon Pricing - <https://www.cdp.net/en/climate/carbon-pricing> and is a part of the Commit to Action initiative - <https://www.cdp.net/en/campaigns/commit-to-action/price-on-carbon>



**Internal Carbon Pricing for Low-Carbon Finance**



**How-To Guide to Corporate Internal Carbon Pricing**



**C-Suite Guide to Internal Carbon Pricing**



**Putting a Price on Carbon: A Handbook for Indian Companies**

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